Insects

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OF THE

AMERICAN

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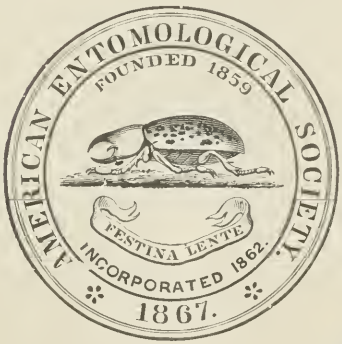

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TRANSACTIONS

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AMERICAN ENTOMOLOGICAL SOCIETY.

VOLUME XXII.

ON THE ORIBATOIDEA OF THE UNITED STATES.

BY NATHAN BANKS.

The Oribatid mites are easily recognized by the division of the body into two regions, cephalothorax and abdomen, by the presence of a seta to a small pore near each posterior corner of the cephalothorax, by having the legs in the normal position (not separated in pairs), and by their coriaceous tegument. Because of this latter character they have often been called "beetle-mites." The body of an Oritabid is readily divided into two parts, the smaller and anterior portion is the cephalothorax, the posterior part is the abdomen; beneath the tip of the cephalothorax is a distinct, articulated portion, the true head. To the head is attached the mandibles and palpi, both of minute proportions. The cephalothorax is usually more or less triangular; a plate of tegument frequently extends from the base of the abdomen down upon the cephalothorax, thus making the surface of the cephalothorax continuous with that of the abdomen, and the dorsal outline entire. This plate is known as the tectal plate or tectum. Whenever there is a distinct break in the dorsal outline of the body at the junction of the cephalothorax and abdomen the tectal plate is considered to be absent. And on this character the true Oribatidæ is divided into two sub-families, the Nothrinæ in which it is absent, and Oribatinæ in which it is present. Most of the genera of the former have but one claw to tarsus, and most of the genera of the latter have three claws; but there are prominent exceptions in each group. In some forms the tectal plate is free at

tip and divided into spines, more often it is wholly united to the cephalothorax and only lateral lines or ridges mark its position; at its tip there is nearly always a pair of bristles, the anterior bristles; and above near base another pair is often present, the superior bristles. Near each posterior angle or corner of the cephalothorax is a round spot or pore; from it arises a seta, often clavate; these pores are supposed to be the breathing stigmata. The legs arise from the underside of the cephalothorax, the posterior pairs apparently coming from the abdomen; the coxæ are often more or less united into a plate, the coxal plate; but there is no real sternum. The legs consist of a coxa, a trochanter, longer femur, a short patella, a long tibia, and a metatarsus and tarsus; the latter two are often more or less united. The claws vary from one to three in number. The abdomen is of various shapes, often quite globose; the dorsum is separated from the venter by a lateral line which is really double. In some forms the base of the abdomen bears lateral expansions of the tegument, these are called wings. On the venter are two apertures, the basal one is the genital opening; the apical one, the anal opening; they are closed by two laterally hinged plates meeting on the median line.

The young are soft-bodied mites, often obovate in form, and sometimes with curious markings. In those species which have three tarsal claws the young usually have but one claw. The young have frequently been mistaken for adults and described under various genera, as *Marcia, Hypochthonius, Claviceps, Michaelia,* etc. The mite upon attaining the adult structure is not necessarily adult; at least they moult several times afterward. These young, but not larval forms are usually paler than the adult, but otherwise do not differ, except in size. According to Michael, who has studied the British species of this family very carefully, the young may be born in four ways: I, as in the insects, the eggs laid and after a time hatching; II, the eggs hatching as soon as laid; III, the eggs hatching just before extrusion, ovo-viviparous; IV, the eggs never being laid, but hatching within the parent some time after the latter's death.

The species are all small, rarely one millimetre long. They occur in many situations, but none, so far as I know, regularly inhabit houses or other buildings. Some occur under the loose bark of dead trees, others on the bark; some on plants, as grass and weeds in meadows; sometimes even in flowers. Some occur in decaying

animal or vegetable substances, as bones, dead fungi, decaying sod. A number inhabit moss, especially *Sphagnum*. Some live on the ground, hiding in crevices, under leaves, sticks, etc. A few are found on water plants, and one on the rocks between tides. They all move quite slowly, and when disturbed are apt to "play possum" and be overlooked. Most of the species are vegetable feeders or scavengers. In the former role they may be injurious, as *O. pratensis*, which is very common in meadows, and *O. arborea*, which occurs in great numbers on cedar and peach trees. In the role of scavengers they may often be beneficial. Packard has stated that *Nothrus ovivorus* sucks the eggs of the canker-worm moth.

Say, in the Jour. Acad. Nat. Sci. of Phil. vol. ii, 1821, described two species of *Oribata*,—*O. concentrica* and *O. glabrata*, both of which I have identified. The former by the peculiar structure of its abdomen is easily placed in *Liodes;* the latter must be an Hoplophorid, as Say states that the cephalothorax can be deflected on the abdomen, and I have considered it to be the common form which I have collected, and which agrees with the description. Dr. Riley described *Hoplophora arctata* in vi Mo. Rept. 1874 (also in St. Louis Acad. Science). From his figures it appears to be a *Tritia*, and I think the young of *T. glabrata* Say. Prof. Packard, in his "Guide to the Study of Insects," described *Nothrus ovivorus;* and Mr. Ashmead, in "Can. Ent." 1879, described *Oribata aspidiotii*. These two forms are very similar, and perhaps, as Haller suggests, identical; I have seen nothing that would agree with them. Their characters are very peculiar, and if adult (which is doubtful) they would certainly be neither *Oribata* nor *Nothrus*, nor would they fit in any genus known to me. *O. aspidiotii* certainly seems to be a young form. Fitch, in the 3d N. Y. Rept., describes *Oribates 4-pilis;* the description is so short and incomplete it is impossible to definitely identify it. Considering its habits I have seen nothing that would fit it; two species of *Oribata* are known to me as occurring in numbers under bark, but both are smooth. It may be my *Scutovertex pilosus*. Karpelles (Beit. z. Naturgesch. d. Milben, Berlin, 1883) has described two species of *Nothrus* from Pennsylvania, *N. malleolus* and *N. pileiformis*. Both are very strange forms (according to the descriptions), and I doubt if they are Oribatids at all, at least not adult ones. I have seen nothing that would agree with them.

Haller (Beschr. ein. neu. Milben, I Amerikanischer Arten; Arch. für Naturgesch. 1884) describes five species from "Amerika" (*Ori-*

bata simplex, *O. monodactyla*, *O. rileyi*, *O. americana* and *Eremæus leporus*). They are probably from Central America, and I have not seen any of them. Berlese states that *O. monodactyla* is the same as *O. dentatus* Berlese. Packard (Cave Memoir) described *Oribata alata* and *Damæus bulbipedata*. The descriptions are incomplete, and the figures not very definite; the former name is pre-occupied by the common European form, and it appears to be similar to my *O. robusta*. The latter, as stated in the text, is a *Belba;* it differs from *B. minuta* Bks. in having only a few hairs on the abdomen, and in some minor characters of the legs. Dr. Riley, in his notes to Hubbard's "Orange Insects," describes *Hermannia (?) trinebulosa*. This is undoubtedly a larval Oribatid, and I have seen forms quite like it, but I am not sure to what species it belongs. The three species placed by Koch in the genus *Clavicepe* (Arach. aus. Siberien, etc.) are young Oribatids; two species very similar to Dr. Riley's form. The larvæ of *Oribata pratensis* and *O. arborea*, which I have collected are of the same shape, but lack the dark patches.

I have seen no form that would exactly fit European species; but *Nothrus excisus*, found on the bark of evergreens, comes very close to the European *N. segnis* found in similar situations. Perhaps on a comparison of specimens, some of our species will prove to be the same as some European forms, particularly those from the northern part of Europe.

The super-family Oribatoidea is at once divided into two well-marked families: the Oribatidæ, in which the cephalothorax is immovably attached to the abdomen; and the Hoplophoridæ,* in which the cephalothorax is movable. The latter family have the dorsum of the abdomen continued down on the sides and venter, leaving only a small ventral region. The Oribatoidæ are readily divided into two sub-families by the presence (Oribatidæ) or absence (Nothrinæ) of a tectal plate. Some authors consider these as families, and equivalent to the Hoplophoridæ. Berlese places two other families in this super-family, the Tarsonemidæ and the Panopliidæ. Canestrini places the Tarsonemidæ next to the Tyroglyphidæ. Neither of the families has much resemblance to ordinary Oribatids, and no forms have been recorded from the United States. The Hoplopidæ are also sometimes placed close to the Oribatidæ; the species are rare, and no forms are known to me.

* This name, I suppose, will have to be changed, as *Hoplophora* is pre-occupied in the Membracidæ; the other genus of the family, *Tritia*, is, I believe, pre-occupied in the Gasteropods.

ORIBATIDÆ.

The following genera are known to me:

1.—With a tectal plate....2.
No tectal plate....6.
2.—With wings to abdomen....3.
No wings....5.
3.—One claw to tarsus....**Oribatodes.**
Three claws to tarsus....4.
4.—Tectal plate wholly attached to the cephalothorax, entire....**Oribata.**
Tectal plate free at tip, which is more or less deeply cleft....**Oribatella.**
5.—Tectal plate quite large, free at tip....**Cephus.**
Tectal plate small, wholly attached to cephalothorax....**Scutovertex.**
6.—One claw to tarsus....7.
Three claws to tarsus....8.
7.—Legs much shorter than body, cephalothorax with lateral ridges or wing-like expansions....**Carabodes.**
Legs slender, posterior pair as long as the body, no wing-like expansions to cephalothorax....**Belba.**
8.—Dorsum composed of concentric rings....**Liodes.**
Dorsum different....**Nothrus.**

ORIBATA Latr.

With a tectal plate wholly united to the cephalothorax; abdomen furnished with lateral wing-like expansions; three claws to the tarsus, the middle one larger than the other two. Body more or less globose, smooth, rarely with bristles; legs shorter than the body and with fusiform joints, thinly clothed with simple hairs, one near the tip of the penultimate joint being much longer than the others.

The genus is very rich in species, and some species are very common. The young are soft-bodied mites, sometimes with one or two large, black spots; upon attaining the adult form it is usually paler and smaller than when really adult.

1.—With short bristles on abdominal dorsum....**hirsuta.**
Without bristles....2.
2.—Wings as high as long, setæ very short....**arborea.**
Wings longer than high....3.
3.—Wings small, triangular, not projecting in front of abdomen....6.
Wings large, more rectangular, projecting in front of abdomen....4.
4.—Lower border of wing emarginate....**emarginata.**
Lower border entire....5.
5.—Abdomen high, convex, a pale spot at base....**robusta.**
Abdomen depressed, no pale spot....**depressa.**
6.—Abdomen depressed, without any small smooth spots, legs short...**mœsta.**
Abdomen high, convex, several small smooth spots....7.
7.—Tectal plate terminated by a distinct transverse ridge....**pratensis.**
No ridge, only a bristle each side....8.
8.—No superior bristles, wings more than half as high as long....**magna.**
Superior bristles present, wings not half as high as long, very small.**affinis.**

Oribata pratensis nov. sp.—Length .7 mm. Yellowish or reddish, legs paler; tectal plate broader than long, terminated by a transverse ridge, at each anterior corner is a bristle, superior bristles long; setæ of stigmata very short, capitate; abdomen high, smooth, three small, smooth spots each side, the basal one oblong; wings small, about half as high as long, triangular; venter smooth, just in front of the anal opening there is the outline of a short, clavate figure; the genital opening fully twice its length in front of the larger anal opening; a black spot on each side of coxal plate. Legs moderate, the femora broad.

Sea Cliff, L. I., N. Y.; swept from grass in great numbers.

Oribata affinis nov. sp.—Length .8 mm. This species has much the resemblance of *O. pratensis*, having a high abdomen, small wings, broad femora, etc. But it differs in a number of ways; the tectal plate is about as long as broad at base, it is not limited by a ridge; there is a faint suture between the base of tectal plate and the abdomen, in which are two round spots; the smooth spots on the abdomen are smaller and indistinct; the wings are not half as large as in *O. pratensis*, being extremely small; the setæ are longer; the genital opening is not quite twice its length in front of the anal; on the coxal plate there is a line each side.

Washington, D. C. Many specimens under the loose bark of a tree.

Oribata magna nov. sp.—Length 1 mm. Reddish, legs paler; tectal plate quite long, no anterior ridge, only a bristle at each corner, no superior bristles; abdomen extremely high and convex, smooth, four small round spots on each side, the three posterior forming a triangle; wings moderate, triangular, fully half as high as long, tip rounded; venter smooth, genital opening not quite twice its length in front of anal; a black spot each side on coxal plate; legs moderate, the femora broad, the posterior pairs distinctly margined; setæ of stigmata moderate, clavate.

Sea Cliff, N. Y. Five specimens.

By its large size and convex appearance it resembles *Cephus nitidus*, but is readily distinguished by its wings, etc.

Oribata mœsta nov. sp.—Length .55 mm. Red-brown, legs yellowish, have never observed a pale spot at base of abdomen; tectal plate terminated each side by a bristle, no anterior ridge, superior bristles quite long, erect; abdomen but little convex, depressed, smooth, shining; wings small, triangular, tip rounded, nearly one-half as high as long, not projecting in front of abdomen; venter smooth, genital opening one and one-half times its length in front of the larger anal opening; coxal lines nearly complete; legs short; setæ moderate, capitate.

Sea Cliff, N. Y. Not uncommon on the ground.

Known by its small wings and flat body.

Oribata depressa nov. sp.—Length .45 mm. Red-brown, no pale spot above, legs yellowish; cephalothorax short, tectal plate terminated each side by a bristle, superior bristles moderate, erect; setæ moderate in length, capitate; abdomen smooth, depressed, plainly longer than broad; wings large and long, projecting in front of the abdomen, twice as long as high, convex behind, in front,

and beneath, no emargination; venter smooth, genital opening about twice its length in front of anal opening; a line and a spot each side on coxal plate; legs short.

One specimen, Sea Cliff, N. Y. Differs from *O. robusta* in smaller size, flat body, more rounded wings, and absence of a pale spot.

Oribata robusta nov. sp.—Length .75 mm. Reddish brown, legs yellow, a small white spot at base of abdomen; tectal plate terminated each side by a bristle, superior bristles erect; setæ clavate, with a quite long stalk; abdomen convex, highest at about the middle, smooth; wings very large and long, broadly rounded behind and below, entire, projecting much in front of the abdomen and obtusely pointed; venter smooth, genital opening twice its length in front of the very much larger anal opening; coxal plate each side with a line broadest at the outer end; legs moderate.

Three specimens from Sea Cliff, N. Y.; two from Ft. Lee, New Jersey; and one from Washington, D. C. Distinguished by the shape of its large wings, and by its long setæ.

Oribata emarginata nov. sp.—Length .75 mm. Black, yellowish at base of abdomen and cephalothorax, tips of legs yellowish, femora often whitish; young specimens more reddish; cephalothorax short and convex, more steep than in allied forms; tectal plate terminated each side by a bristle; superior bristles short, erect; setæ moderate, clavate; abdomen broad, high, convex, smooth, shining, two incisions on anterior margin; wings large, somewhat rectangular, projecting in front of abdomen, anterior and posterior sides oblique and convex, rounded beneath on posterior part, strongly emarginate a little in front of middle, venation often quite distinct; venter smooth, genital opening about once and a half its length in front of the larger anal opening; a line on each side of coxal plate; legs as usual.

Not very common, in moss. Sea Cliff, N. Y.; Chicago, Ill.; Brazos County, Texas. Easily recognized by its large, emarginate wing and dark color. A male adult is somewhat smaller.

Oribata arborea nov. sp.—Length .6 mm. Yellow, or reddish brown, often with a white spot at base of abdomen; body moderately convex and high, highest behind; tectal plate terminated each side by a bristle, superior bristles moderate, erect; setæ very short, clavate; abdomen smooth, sometimes showing an oblong spot at base; wings as high as long at base, tapering each side to the rounded tip; venter quite smooth, genital opening once and a half its length in front of the much larger anal opening, a short transverse line a little in front of anal opening, two lines each side on coxal plate; legs about as usual, posterior femora broad.

Sea Cliff, N. Y. Common on cedar and peach trees. Readily distinguished by the shape of the wings and by the very short setæ.

Oribata hirsuta nov. sp.—Length .4 mm. Wholly pale brownish yellow; cephalothorax triangular, convex, two superior bristles and two marking its tip; setæ short, capitate; abdomen not high, a little longer than broad, smooth, ante-

rior margin with two incisions, bearing above about thirty bristles, those near the tip slightly longer than the others; wings moderate, somewhat triangular, rounded, the lower margin incurved; venter quite roughly granulate, the genital opening much more than its length in front of the larger anal opening; two short lines each side on the coxal plate; legs short.

Sea Cliff, N. Y. Quite common, especially in sandy places, under dead leaves. Readily distinguished by its small size, bristly body and yellowish color.

ORIBATELLA nov. gen.

The tectal plate is large and joined to the cephalothorax only at base, the apex free and usually divided into two or more lobes or spine-like projections. The body is more often bristly than in *Oribata*, otherwise it is very similar to that genus.

Though several species are known to me they are all moderately rare, strongly contrasting in this respect with the abundance of several species of *Oribata*.

1.—With some bristles on abdomen.....2.
No bristles on abdomen.....4.
2.—Tectal plate bidentate.....3.
Tectal plate quadridentate.....**4-dentata.**
3.—Bristles arising from dark spots, wing small, triangular.....**bidentata.**
Bristles not arising from dark spots, wing large, semi-circular.....**obesa.**
4.—Wings armed in front with a large spine.....**armata.**
Wings unarmed.....5.
5.—Tectal plate divided into four long pointed spines.....**aquatica.**
Tectal plate divided into two truncate lobes.....**signata.**

Oribatella 4-dentata nov. sp.—Length .6 mm. Reddish, legs paler, and a triangular yellow spot at base of abdomen; tectal plate large, divided in front into four long, equal spines, a long bristle each side at the inner base of the outer spine, superior bristles shorter; setæ of stigmata short; sides of head concave; abdomen nearly circular, moderately high, base rounded, with about twenty-four long, stiff bristles; wings large, finely reticulate, anterior margins finely dentate, terminating below in a small spine; venter smooth, genital opening about once and a half its length from the equal anal opening; coxal plate with a line each side; legs short, with stiff bristles.

I have one specimen of this fine species from Sea Cliff, N. Y.

Oribatella bidentata nov. sp.—Length .5 mm. Cephalothorax reddish, abdomen nearly black, with a yellow spot at base, legs yellowish; tectal plate narrow, deeply bifid at tip, with a short, stiff bristle at end of each projection; superior bristles long, erect; setæ quite long, clavate at tip; abdomen depressed, longer than broad, smooth, with about twenty black patches each giving rise to a bristle; wings moderate, triangular; venter smooth, genital opening not much more than its length from the larger anal opening; coxal plate with a black line each side; legs very short and stout, femora broad, those of anterior pairs margined.

Sea Cliff, N. Y. Uncommon, in moss; to the naked eye it has a black, shiny appearance.

Oribatella obesa nov. sp.—Length .6 mm. Reddish, legs yellowish, a pale spot at anterior edge of abdomen; tectal plate not very large, deeply bilobed, each lobe slightly rounded and with a bristle at tip, superior bristles moderate, suberect; setæ short, clavate; abdomen broad, depressed, finely granulate, with a few bristles, most numerous toward tip, no dark spots; a small, oblong, light one each side near base and three rounded ones near tip; wings quite large, nearly semi-circular; venter smooth; legs moderate, a plate behind and one in front of anterior coxæ.

Two specimens, one Olympia, Wash. (Trevor Kincaid); the other in a vial of Sea Cliff things, but it may have gotten in by mistake.

Oribatella aquatica nov. sp.—Length .55 mm. Dark reddish, legs yellowish, a pale spot at base of abdomen; body very broad, nearly circular, moderately depressed, smooth; tectal plate short and broad, ending in front in four slender spine-like projections, the lateral ones being sinuate and more closely appressed to the sides of the cephalothorax, the median or dorsal pair slightly curved and with a bristle at tip; superior pair of bristles long, curved forwards; setæ moderate, clavate; abdomen large and broad, anterior edge advanced in the middle; wings moderate, oblong; venter smooth, genital opening not much more than its length from the larger anal opening; coxal plate divided.

Not uncommon, Sea Cliff, N. Y. This species lives on aquatic plants, and can walk over the surface of stagnant water very readily; I have kept specimens in an aquarium for several months. There is nothing peculiar in the structure of the feet.

Oribatella signata nov. sp.—Length .45 mm. Dark reddish brown, legs yellowish, a pale triangular spot at base of abdomen; body moderately high, convex, dorsum smooth; tectal plate large, reaching to end of the cephalothorax, triangular, sides slightly concave, truncate in front and deeply bifid, a short stiff bristle at each corner of the lobes; superior pair of bristles long, curved, directed forwards; setæ quite long, clavate; abdomen longer than broad; wings moderately large, triangular, projecting somewhat in front, lower margin rounded; venter smooth, genital opening about once and a half its length from the much larger anal opening; a dark line each side on the coxal plate; legs moderate, a little more hairy than usual.

Two specimens, Sea Cliff, N. Y.

Oribatella armata nov. sp.—Length .55 mm. Dark reddish, legs yellowish, a yellow spot at base of abdomen; body high, convex, smooth; tectal plate oblong, deeply cleft, end of each lobe rounded, a small bristle from each; superior bristles moderately long, directed forwards; setæ quite long, clavate; dorsum of abdomen with a few indistinct short hairs; wings large, somewhat oblong, with a very large curved spine from the upper anterior margin; venter smooth, genital opening not quite once and a half its length in front of the anal opening; coxal plate divided by a long dark line each side; legs about as usual, a curved plate behind anterior coxæ.

Sea Cliff, N. Y. Four specimens.

ORIBATODES gen. nov.

Somewhat resembling the two preceding genera, with a large free tectal plate, wings to the abdomen, legs slender, with fusiform joints and simple hairs, the tarsus with but one claw, the genital opening is large and just in front of the larger anal opening, not well separated from it. The roughened appearance of the only species known to me also distinguishes it from its allies.

Oribatodes mirabilis nov. sp.—Length .5 mm. Dark red-brown, legs barely paler; body short, broad and convex; tectal plate large, the lateral margins somewhat reflected, front margin broad, concave, the corners sharp pointed and each bearing a short, stiff, curved bristle; two superior bristles very long, directed somewhat forward; setæ quite long, clavate; abdomen globose, granulate, with an irregular network of ridges, bearing above about sixteen long, stiff, finely serrate and almost clavate bristles, disposed mostly in a longitudinal row each side, a transverse row of four or six much shorter, distinctly clavate ones at tip; wings moderate, granulate, incurved, not extending in front of the abdomen; venter with some irregular ridges, genital opening large, barely separated from the larger anal opening; coxæ mostly free; legs short, a large curved plate each side of coxæ I.

In rotten débris under loose bark of dead trees, Sea Cliff, N. Y. Five specimens were taken at different times during the Summer; two specimens have the genitalia extruded, so the form must be perfectly mature.

CEPHUS Koch.

Tectal plate free at tip, no wings to abdomen, legs with fusiform joints and simple hairs, three equal claws to tarsus, genital opening much in front of the anal.

The genus has much the appearance of *Oribata*. I have two species.

Abdomen densely punctulate.....**punctulatus.**
Abdomen smooth.....**nitidus.**

Cephus punctulatus nov. sp.—Length .85 mm. Dark reddish, legs paler; cephalothorax narrow, with the tectal plate reaching nearly to tip of head, front quite broad, truncate and cleft, with several short and one long bristle on each side, lateral margins wing-like; superior bristles moderate; setæ short, clavate; surface of tectal plate and cephalothorax finely punctulate; abdomen elliptical, finely and densely punctulate, with two short, stiff hairs on each shoulder, and six near the tip and one each posterior side; venter granulate, anal plates smooth; legs short.

Sea Cliff, N. Y. In a decaying fungus and swept from weeds; rare.

Cephus nitidus nov. sp.—Length 1. mm. Dark reddish, legs yellowish; tectal plate moderate, triangular, appressed to cephalothorax, but from the side

seen to be free, terminated each side by a short stiff bristle, its surface smooth; superior bristles short, erect; setæ moderate, clavate; abdomen large, globose, high, smooth; venter smooth, genital opening more than twice its length in front of the very much larger anal opening; legs short, just behind coxæ I is a large curved plate reaching to the upper corner of the cephalothorax; coxal plate with three complete lines.

Quite common on the ground, under pieces of wood, bark, stones, etc. Sea Cliff, N. Y.; Ft. Lee, N. J.; Washington, D. C. I have two or three much smaller specimens which are proportionally narrower and more depressed, but I think they are the same.

SCUTOVERTEX Mich.

Tectal plate small, united to the cephalothorax; no wings to abdomen; legs with fusiform joints and simple hairs; tarsi with three claws; genital opening some distance in front of anal opening. Of the two species placed here one (*pilosus*) has the claws equal; the other has the middle claw the larger. The former would thus seem to be an *Oppia*, but the tectal plate is quite different from that genus, and moreover the two species appear to be otherwise very closely related.

Abdomen with prominent bristles, as long as the setæ.....**pilosus.**
Abdomen with only very short and fine hairs.....**concolor.**

Scutovertex pilosus nov. sp.—Length .8 mm. Yellow-brown; body moderately high and convex, smooth; tectal plate completely united to the cephalothorax, reaching about half way to tip, two long bristles at tip, superior bristles long, erect; setæ of stigmata short and clavate; dorsum of abdomen with about eighteen or twenty long bristles in four rows; venter finely granulate, genital opening much more than twice its length in front of the larger anal opening, a curved ridge just behind anal opening; coxal plate divided in the middle, a line in front and behind on each side; legs moderate, femora broad; three equal tarsal claws.

Sea Cliff, N. Y.; Ft. Lee, N. J. Quite common in crevices of the bark of trees.

Scutovertex concolor nov. sp.—Length .4 mm. Yellowish brown; tectal plate short, wholly united to cephalothorax, truncate in front, terminated each side by a bristle, superior bristles moderate; setæ quite long, clavate; abdomen somewhat depressed, smooth, longer than broad, with some scattered, very short and very fine hairs; venter smooth or finely granulate, genital opening nearly twice its length in front of the larger anal opening; coxal plate divided and a line each side in front and behind; legs moderate, femora quite broad; tarsal claws unequal, the middle being the largest.

Sea Cliff, N. Y. In dead fungi.

BELBA Koch.

No tectal plate, no wings to abdomen, tarsi with but one claw, no wing-like expansions to cephalothorax; legs long and slender, the hind pair as long as body, the joints nodulate and with simple hairs, the ventral apertures in the typical forms are widely separated.

Abdomen smooth, ventral apertures widely separated..... **minuta.**
Abdomen minutely spinulate, ventral apertures approximate..... **australis.**

Belba minuta nov. sp.—Length .45 mm. Yellowish brown cephalothorax convex, triangular, two anterior bristles; two superior bristles erect, shorter than the long, slightly clavate setæ; abdomen elliptical, convex, smooth, with about fifteen prominent bristles above; venter smooth, genital opening fully twice its length in front of the much larger anal opening; anterior coxæ free, the posterior pairs united into a plate without any line or spot on the sides; legs slender, the posterior pair as long as the body.

Sea Cliff, N. Y.; Chicago, Ill.; Ft. Lee, N. J. This very common mite is chiefly in decaying animal substances, but it frequently occurs in moss, under bark, on the ground, etc.

Belba australis nov. sp.—Length .6 mm. Red-brown, trochanters and femora darker; cephalothorax quite high, two pairs of curved bristles in front, a pair of bristles a little in front of and shorter than the setæ, the latter are very long and not clavate, the stigmata prominent; the abdomen is high, convex and minutely spinulate above, and with about a dozen stiff, strongly curved bristles; venter smooth, genital opening barely separated from the anal opening; coxæ united into a large plate with two lines each side; legs slender, the posterior pair longer than the body.

One specimen, Shreveport, La. This species might form a separate genus on account of the position of the genital opening, the simple setæ, and the structure of the coxæ.

CARABODES Koch.

No tectal plate, but with a transverse crest in front of the stigmata giving rise each side to an elevated, often plate-like ridge; abdomen without wings, usually with clavate hairs; legs shorter than body, barely nodulate, provided with simple hairs; each tarsus with one claw; genital and anal apertures usually approximate.

1.—The genital opening far in front of anal opening..... **oblonga.**
The openings approximate..... 2.
2.—Black, four rows of white scale-like hairs..... **nigra.**
Yellowish, clavate hairs mostly at tip..... **apicalis.**

Carabodes nigra nov. sp.—Length .5 mm. Black, legs yellowish or reddish; cephalothorax broadly triangular, narrowed behind, a few hairs at tip; crest large, with two large spatulate white hairs above, and behind on each side a circular elevated area which is minutely pitted; the setæ of stigmata quite long

and clavate; abdomen broadly elliptical, posterior margin crenulate, with many deep pits above and four rows of four large spatulate white hairs; sides striate; venter smooth, legs short, barely nodulate, the femora thickened, other joints slender, with a few simple hairs; genital and anal apertures large and close together.

Sea Cliff, N. Y. Common in decaying fungi (*Polyporus*); a few specimens found under a piece of bark on the ground.

Carabodes apicalis nov. sp.—Length .45 mm. Reddish, legs yellowish; cephalothorax sub-triangular, anterior sides concave, posterior sides nearly straight, slightly contracted behind, with a curved ridge each side from tip to stigmata, several other smaller ridges, stigmata large, setæ short, clavate; two stiff clavate hairs near middle, and two fine hairs at tip; abdomen truncate at base, gradually growing wider, broadly rounded behind, a few irregular ridges each side and above irregularly reticulate with ridges, each side a sub-median row of three clavate hairs and about ten or twelve similar ones around the tip: venter smooth, with two lines each side; genital aperture nearly circular, slightly separated from the anal opening; palpi more prominent than usual; legs short, slightly nodulate, the femora, especially femur I, quite long, the tarsal joints much abbreviated, with very few hairs, except at tip.

Sea Cliff, N. Y. Six specimens.

Carabodes oblonga nov. sp.—Length .55 mm. Black, legs yellowish; cephalothorax truncate in front, covering the pointed head, emarginate, and with four curved stiff bristles, surface granulate, sides consist of plate-like expansions, a large bristle each side, and a smaller median pair; stigmata near margin, setæ moderate, clavate: abdomen truncate in front, over once and a half as long as broad, not much broader in middle than at base, tip broadly rounded; surface deeply and finely pitted; with about twenty-eight stiff bristles above, mostly arranged in four rows, those near base project forward over the cephalothorax, the rest are directed toward the apex; venter granulate, the coxæ all united to its surface; the genital opening nearly twice its length in front of the anal opening; legs short, barely nodulate, femora thickened, tibiæ pedicellate.

Sea Cliff, N. Y. One specimen found under bark of a stump, the bark was not yet dead nor loose. To the naked eye it looks much like a small Scolytid beetle. This species should probably form a new genus on account of the cephalic structure and of the widely separated ventral apertures.

NOTHRUS Koch.

The cephalothorax is immovable; the tectal plate and wings are both absent; the body is more or less rectangular and usually furnished with some clavate hairs; the legs are short and stout; the basal joints about equal in length and in thickness, furnished with stiff, thickened, sometimes clavate hairs; the tarsi are all furnished with three equal claws; the genital and anal openings are very large, and surrounded by several sutures.

Their often roughened appearance and short legs give them a strange habitus. They are found in various situations, in moss (especially *Sphagnum*), under bark, on trees, etc They move very slowly, and when disturbed will often lie still for several minutes.

1.—A pair of curved hairs at tip of cephalothorax.....2.
No such hairs.....4.
2.—With only simple hairs at tip of abdomen.....**furcatus.**
Clavate hairs at tip of abdomen.....3.
3.—Tip of abdomen deeply excised.....**excisus.**
Tip of abdomen barely excised.....**rugulosus.**
4.—With short clavate hairs at each posterior angle of abdomen...**truncatus.**
With long simple hairs at each angle of abdomen.....**bipilis.**

Nothrus truncatus nov. sp.—Length .7–.8 mm. Dark reddish, younger specimens yellowish, with a dark central spot; body quite high behind; dorsum convex, finely granulate; cephalothorax quite long, triangular, contracted above first pair of legs, with a median suture, no hairs in front, a short clavate one each side close to the stigmata, setæ of stigmata long and simple; abdomen wider behind, sides slightly sinuate, truncate in front and behind, margin elevated, a sub-marginal ridge converging near tip, a sub-marginal and a sub-median row of five clavate hairs, at each posterior angle a large clavate hair, and a pair of smaller ones near the middle of tip, sides of abdomen smooth; the legs are stout, with a few stiff hairs, finer near the tips. Young specimens are paler and have a lower abdomen.

Sea Cliff, L. I., N. Y. Several specimens from *Sphagnum*, one in some moss on a rock, another under decaying sod.

Nothrus bipilus nov. sp.—Length 1. mm. Dark reddish, sides and venter paler. Similar to *N. truncatus*, but the abdomen much broader and higher, the side piece of abdomen being nearly as high behind as it is long; at each posterior angle of the abdomen, instead of the short clavate hair as in *N. truncatus*, is a very long, curved, simple hair; the genital and anal openings are broader than in the preceding species.

Sea Cliff, L. I., N. Y. One adult and two young specimens from *Sphagnum*.

Nothrus furcatus nov. sp.—Length .7 mm. Reddish brown; body flat; dorsum smooth; cephalothorax triangular, narrowed behind, with a curved ridge each side, two stiff curved hairs in front and two bristles above, seta quite long, not clavate; abdomen gradually growing wider, base truncate, tip broadly rounded, crenulate and bearing eight curved bristles, four bristles on each side margin; above, a sub-marginal ridge each side reaching from base to near posterior angles, between their tips a curved, transverse, sub-apical ridge, in the centre of dorsum a forked ridge reaching from base to near sub-apical ridge, four simple hairs arise from each branch of the fork, a few simple hairs at base of dorsum; legs stout with short, stiff, curved bristles.

Olympia, Wash. [Trevor Kincaid]. Several specimens.

Nothrus excisus nov. sp.—Length .7 mm. Pale brown, legs a little darker; body quite flat; dorsum irregularly roughened; cephalothorax sub-triangular, truncate in front, from each anterior angle projects a stiff curved hair; stigmata elevated, prominent, with a short capitate seta; abdomen truncate in front, slightly broader in the middle, deeply emarginate behind, from each posterior angle projects a roughened clavate hair, and a sub-clavate hair from each side just before the angles, beneath tip a median pair of smaller clavate hairs; starting from near the base there is each side a sub-median ridge, which near the tip curves toward the posterior angles, at point of curvature is a short transverse ridge; on each side margin there are three or four very short clavate hairs; the sides, venter and legs, are all roughened, the latter with stiff, curved bristles, finer near tips; most of the hairs on the body when much magnified are seen to be serrate; the form of the cephalothorax is caused by the development of the upper surface over the anterior end of the head, the latter, as usual, being blunt pointed.

Sea Cliff, L. I., N. Y. On the bark of spruce trees, where it is much protected by its color.

Nothrus rugulosus nov. sp. Length .7 mm. Dark brown, abdomen paler; related to *N. excisus*, but the abdomen is truncate behind, not deeply emarginate, in some specimens a little rounded; there are four large clavate hairs on each side margin, the margins are roughened, but the general surface of the dorsum is smooth, the abdomen is as wide in front as behind, and but slightly wider in the middle; the two hairs, at tip of cephalothorax, are much more clavate than in *N. excisus*, the seta of stigmata is clavate; the legs are roughened and furnished with stiff, curved hairs.

Sea Cliff, L. I., N. Y. Under loose bark of dead trees; a specimen from Chicago, Ill., seems to be the same species.

LIODES Berlese.

This genus differs from *Nothrus* in having the dorsum of the abdomen composed of concentric rings; the legs are more slender and smoother, more like *Oribata* than *Nothrus*, in that the patella is very short compared with the femur and tibia.

We have but one species, which was discovered and described by Say.

Liodes concentricus Say.

Oribata concentrica Say. Comp. Writ. LeConte Ed.

Length 1.3 mm. Black; cephalothorax broadly triangular, narrowed behind, margins serrate, seta short, clavate; abdomen elevated, dorsum composed of four concentric circles, connected to each other by curved lines or ridges, the circles are not perfect, but elongate and pointed behind, the central one is divided by a median line, which is connected to the sides by oblique lines; there are a few fine hairs on the anterior margin of the abdomen; sides and venter granulate, legs quite long, smooth, and with a few simple white hairs.

Washington, D. C. Several specimens under bark of an elm tree. Say had it from Pennsylvania; Enterprise, Fla. (H. G. Hubbard).

HOPLOPHORIDÆ.

This family differs considerably from the Oribatidæ. The cephalothorax is movable, and the dorsal integument of the abdomen is continued down upon the sides and venter, leaving only a small ventral region or true venter, which contains the usual apertures. The legs are shorter and the coxæ more free than in most Oribatids.

One claw to tarsus, ventral region broad..... ....**Hoplophora.**
Three claws to tarsus, ventral region narrow.....**Tritia.**

TRITIA Berl.

Body more or less oblong, especially in the young; tarsi with three claws; ventral region very narrow, several times as long as broad.

Tritia glabrata Say.

Oribata glabrata Say, Comp. Writ. LeConte Ed.

Hoplophora arctata Riley, vi, Mo. Rept. 1874.

Length 1. mm. Dark red-brown; cephalothorax a little longer than broad, broadly rounded in front, wholly covering the head, smooth, a few hairs in front, at each posterior angle a round stigmata with a simple seta; legs very short, smooth, with simple hairs; abdomen large, high, very convex, truncate in front, smooth, anterior sides oblique, nearly meeting on the venter, only leaving a very narrow slit, which contains a long cleft ridge, the anterior portion being the genital opening, and is terminated by a transverse line; on each side of the slit near the tip is a fine hair; above on the dorsum several scattered, quite long, and very fine hairs.

Common on the ground. Sea Cliff, N. Y. Say's specimen was from Florida. Dr. Riley's *H. arctata*, from Missouri, is, I think, only the young of this species, at least it agrees well with the forms which I take to be the young found on Long Island.

HOPLOPHORA Koch.

Body usually globose, one claw to tarsus, venter quite broad, the apertures usually broader than long.

Hoplophora setosa nov. sp.—Length .6 mm. Cephalothorax and legs yellowish, abdomen dark brown; cephalothorax once and a fourth as long as broad, somewhat pointed in front, above showing two large lateral depressions; stigmata circular bearing a clavate seta, a pair of superior bristles near base and a pair of short stiff ones in front; legs short, finely granulate, and with simple hairs, some very long; abdomen high, globose, convex, smooth, with a basal transverse row of four long bristles, and behind with two longitudinal rows of about four long bristles, the longest bristles are as long as the cephalothorax; venter broad, genital opening broader than long, connate with the equal, posteriorly rounded, anal opening, three hairs on each side of the venter.

Sea Cliff, N. Y. On the ground.

Holophora sphærula nov. sp.—Length .6 mm. Similar to *H. setosa*, but the body is more globose and higher, and the bristles are not one half so long, barely longer than the setæ, six pairs of them above; the setæ are thick, but taper to a sharp point, spatulate rather than clavate; otherwise about the same.

Three specimens, Sea Cliff, N. Y.

A MONOGRAPH OF THE TRIBE BASSINI.

BY G. C. DAVIS.

This tribe is characterized primarily by the form of the mandibles, which have the superior tooth divided or notched at the tip, so that in appearance there are three teeth to each mandible. It is further characterized by having the head broader than deep, clypeus separated; antennæ filiform, composed of from twenty to twenty-five joints, the first one cup-shaped, irregularly and diagonally truncated, the second much smaller, considerably inserted in the first, the third cylindrical and longer than those following it, thorax short, broad, narrowing gradually posteriorly; abdomen broadly sessile, composed usually of six segments, the first of which is often traversed by two longitudinal carinæ, and sometimes the first two or three segments are crossed by a transverse groove (genus *Bassus*); ovipositor short, often not exserted. The general form is short and thick set, though the smallest species (genus *Promethus*) are more slender. The sexes differ by the ♂ being smaller and less robust; they also differ in color markings, the most notable of which is the entire yellow face of the ♂, never found in the ♀, and in the other yellow markings which are more largely developed in the ♂ than in the ♀.

In the immature stage, Bassini are well known as parasitic on Syrphus fly larvæ. The individual host of the various species seems to be unknown. In our rearings, *Bassus scutellaris* was bred from a Syrphus larva on rag weed, August 31st, and we have reared *Bassus lætatorius*, *Syrphoctonus agilis* and *Promethus costalis* from Syrphus larvæ feeding on *Aphis brassicæ*. To Mr. Ashmead we are indebted for the note on finding *Bassus orbitalis* and *Syrphoctonus pacificus* parasitic on Syrphus larvæ feeding on the same. He also reports the rearing of both sexes of *Syrphoctonus pleuralis* from a Syrphus puparium on rose. The species do not seem to confine themselves to any one species of Syrphidæ. Mr. Cresson has a ♂ and ♀ of *Syrphoctonus agilis* reared from a species of *Spharophoria*, while this year we have reared the same species from quite a different puparium taken on willow. We have reared *Bassus lætatorius* from several entirely different puparia. In Europe *B. lætatorius* has been found

parasitic even on other orders as Vanvollenhoven refers to Tischbein, who bred a specimen from the coleopterous larva of *Adimonia rustica*, and Reissig, the same species from a Tortrices.

All specimens having the distinctively characteristic teeth, spoken of above, were first classified under the genus *Bassus* by Fallin in 1813, although it is true that the name had already been used by Fabricius in 1804 in the "Systema Piezatorum," but with a far more general and indefinite classification. In 1868, Foerster, after years of work and study on the Ichneumonidæ, wrote a synopsis of the family in which he made the old genus *Bassus* a family, and still further restricted the genus *Bassus* as one of the genera in this family. His family Bassidæ, or what is now considered a tribe in other orders, is represented by ten different genera, six of which are found in our American fauna. The characters used are plain, easy to determine, and will greatly aid in a further and closer classification of our old genus *Bassus*.

His synopsis is as follows:

The basal segment of abdomen with a cross suture ..... 1. **Bassus** Grav.
The basal segment of abdomen without a cross suture.
  Wings without areolet.
    Face perfectly smooth.
      Antennæ with more than twenty joints ..... 2. **Promethus** Foers.
      Antennæ with twenty joints or less.
        Clypeus very broad, the spiracles of the same separated farther than the margins of the eyes ..... 3. **Bioblapsis** Foers.
        Clypeus not very broad, the spiracles not separated farther than the margins of the eyes ..... 4. **Liopsis** Foers.
    Face finely shagreened.
      Metanotum more or less areolated ..... 5. **Zootrephes** Foers
      Metanotum not areolated ..... 6. **Syrphoctonus** Foers.
  Wings with an areolet.
    Metanotum areolated.
      The longer spur of the hind tibiæ extending half the length of the first tarsal joint ..... 7. **Aniarophron** Foers.
      The longer spur of the hind tibiæ not extending half the length of the first tarsal joint ..... 8. **Phthorima** Foers.
    Metanotum not areolated.
      Base of second segment bicarinate, venter of the same indented. 9. **Enizemum** Foers.
      Base of the second segment without ridge, venter of the same not indented. 10. **Homotropus** Foers.

It is somewhat surprising at the number of synonyms found in monographing the tribe. These are mostly due to the great difference in color markings of the sexes, the male and female of the same

species being often described as two different species. Through the kindness of those having the types of Messrs. Cresson, Ashmead and Provancher in charge, I have been enabled to study the types, with the exception of one or two of Provancher's, and compared them carefully. I have also found specimens comparing well with descriptions made by Walsh, and with Mr. Cresson's large collection to work with, have succeeded in much the more thoroughly systematizing the tribe than could otherwise have been done. More than this, most of the species were originally described from a single specimen or two of only one sex. As both sexes are now known of a large share of the species (21 of the 29) and there was much more material at hand for description, the monograph did not seem complete without a short description of each species, which will enable the determination of each sex and a more definite of the species than otherwise could be.

BASSUS Grav.

Posterior tibiæ black, with broad white band.

Abdomen rufous, black at base and apex; tips of tibiæ usually red.

lætatorius Fabr.

Abdomen black only at apex ..... var. **sycophanta** Walsh.

Abdomen black, with only terminal parts of segments 2, 3 and 4 rufous; tip of tibiæ red, with a black annulus between the red and white.

var. **terminalis.**

Abdomen black, marked more or less with pale spots or bands; if middle segments are margined with rufous, the posterior tibiæ not red at tips.

Pleuræ black and yellow ..... **orbitalis** Cr.

Pleura and sternum honey-yellow ..... **scutellaris** Cr.

Posterior tibiæ white, black at tips.

Pleura black ..... **cinctipus** Cr.

Pleura in part rufous ..... **pulchripes** Prov.

Bassus lætatorius Fabr. (*Ichneumon*) Syst. Piez. p. 63.

B. tripicticrus Walsh, St. Louis Acad. of Sci. iii, 85, ♂ ♀.

♀.—Length 6 mm. Head, thorax, base and tip of abdomen, hind tarsi, base and lower middle of hind tibiæ, black; four anterior legs, posterior coxæ, femora, and often tips of tibiæ, tip of abdominal segment 1, whole of 2 and 3, and more or less of 4, rufous; anterior orbits, mouth, tegulæ, spot in front, line beneath, cuneiform spots on mesonotum, scutellum, post-scutellum, and band on posterior tibiæ, white.

♂.—Differs only in having the face, scape beneath and a stripe on pleura, yellowish white.

Var. *sycophanta* Walsh, differs in having the basal segment of the abdomen rufous; the metathorax also is rufous sometimes in this variety.

Var. *terminalis.*—For the want of a better name this dark variety may be known as *terminalis.* It has only the terminal half of segments 2, 3 and 4 of the abdomen rufous.

This is one of the most common and wide-spread species in America and Europe.

Bassus orbitalis Cr., Proc. Ent. Soc. Phila. iv, 272, ♀.

B. cinctulus Cr., Proc. Acad. Nat. Sci. Phila. 1878, 375, ♂ ♀.

B. orbitalis Ashm., Proc. U. S. Nat. Mus. xii, 439, ♀.

♀.—Length 5–7 mm. Black; broad orbital lines, sometimes spot on face, mouth, tegulæ, spot in front, line beneath wings, line on margin of mesonotum often recurving into two parallel lines in the centre, scutellum, post-scutellum, broad central band on hind tibiæ and more or less of abdomen at tip of segments, yellowish white. Base and tip of posterior tibiæ and hind tarsi black; four anterior coxæ and trochanters variable; metathorax coarsely punctured, rugose; first segment of the abdomen with two parallel carinæ.

♂.—Has the face and scape beneath white and usually most of the abdominal segments margined with yellowish white, which varies to ferruginous. It is the *cinctulus* of Cresson.

Fifteen female and twenty-three male specimens from Colorado, Nevada, California, Montana, Oregon, New York, New Hampshire and Ottawa, Canada.

Bassus scutellaris Cr., Trans. Amer. Ent. Soc. ii, 112.

♀.—Length 4-6.5 mm. Black; pleura, sternum, and most of legs, honey-yellow; orbits, spot on front, mouth, tegulæ, spot in front below and above, scutellum, post-scutellum, annulus on posterior tibiæ, and more or less of the margins of the abdomen, white; remainder of posterior tibiæ and tarsi black; metathorax and first three segments of abdomen, from base to transverse groove, rugose; deeply punctured.

♂.—Differs only in having face, scape beneath, and four anterior coxæ and trochanters white.

Five female and two male specimens from Illinois, Michigan, Ottawa (Canada), Georgia, Virginia and Mt. Hood, Oregon.

Bassus concinnus Cr., Trans. Amer. Ent. Soc. ii, 111.

♀.—Length 5.5 mm. Black, legs honey-yellow, except the trochanters and anterior coxæ, which are yellowish white; posterior tibiæ, which are white, black at tips, and posterior tarsi which are black. The following parts are marked with yellowish white; anterior orbits, mouth, tegulæ, spot in front, above and below, scutellum and post-scutellum; metathorax and base of abdomen coarsely and deeply punctured as in *scutellaris*; first segment with two distinct carinæ.

♂.—Same, except entire face, underside of antennæ and four anterior legs, white; the terminal portions of the abdominal segments are slightly rufous.

Two female specimens from Connecticut, and one male from Mass.

Bassus pulchripes Prov., Faune Ent. Can. ii, 428.

♀.—Length 5–7.5 mm. Black, with pleura, scutellum usually, and a patch in front of it, rufous. Legs variable from rufous to almost white; posterior tarsi, except basal segment, which is white, and tip of posterior tibiæ black; mouth, short orbital lines in front, tegulæ, spot in front, line below, broad line on margin

of mesonotum, line on side between meso- and metathorax, tip of scutellum and post-scutellum reddish yellow. One ♀ has the entire mesothorax rufous. Abdomen closely punctured and covered with a fine sericeous pile.

♂.—Has the face, scape beneath, prosternum, more or less of pleura, and generally the legs, except posterior femora, white.

Seven female and six male specimens; two from New Hampshire, one from Ottawa, and the remainder from Colorado.

PROMETHUS Foerster.

Mesonotum black, without yellow markings . . . . . **costalis** Prov.
Mesonotum with yellow bands in front of tegulæ.

♀.—Posterior coxæ black or yellow; ♂ with the face entirely yellow.
elongatus Prov.

♀.—Posterior coxæ same color as femora; ♂ face black, yellow down the centre . . . . . **ruficrus** Walsh.

Promethus costalis Prov. (*Bassus*), Faun. Ent. Can. ii, 432, ♀.
B. longicornis Prov. ibid. 799, ♂.
B. aciculatus Prov. Add. Faune Hymen. 368, ♀.
B. auriculatus Prov., ibid. 429, ♀.

♀.—Length 4–5 mm. Head, thorax, base, and usually extremity of abdomen, shining black; mouth, tegulæ, spot in front and line beneath each wing, light yellow; antennæ slender, reddish brown. Wings large, very clear, veins and stigma light brown; areolet incomplete, pentangular in outline. Abdomen slender; first and second segments aciculated, tip of segment 2, all of 3 and 4, and base of 5, rufous. Legs, except coxæ, honey-yellow.

♂.—Differs only in having the entire face and scape beneath, light yellow. The three synonyms of *costalis* are all from descriptions of males.

Four female and four male specimens; Canada, New Hampshire, Montana, Washington.

Promethus elongatus Prov. (*Bassus*), Faune Ent. Can. ii, 799, ♂ ♀.

♀.—Length 4–5 mm. Black, with segments 2, 3 and 4 of the abdomen more or less red; antennæ reddish brown; spot beneath at base, mandibles, palpi, tegulæ, spot in front, beneath and above on mesonotum, trochanters and tips of coxæ yellowish white. Base of coxæ generally black; posterior tarsi dusky; remainder of legs honey-yellow; metathorax coarsely punctured; first segment of abdomen long, rectangular and rugose; second segment aciculated.

♂.—Differs in having the entire face, antennæ beneath and a crescent on the mesonotum yellowish white.

Four female and two male specimens from Canada, New Hampshire and Michigan.

Promethus ruficrus Walsh (*Bassus*), Trans. St. Louis Acad. iii, 86, ♂.

♀. Length 5.5 mm. Black, polished; central portion of abdomen, legs and antennæ rufous; spot beneath antennæ extending on to sides of clypeus, mandibles, except tips, palpi, tegulæ, spot in front, lines beneath each wing, short line on mesonotum, transverse line on prosternum, diagonal line on mesopleuræ, all

the trochanters and four anterior coxæ, yellowish white. Abdomen beyond first segment strongly compressed; first segment black, densely punctured, second segment entirely rufous; third, fourth and fifth rufous, with black spot above; remaining segments black; venter rufous, except at tip. In one specimen the pleuræ have a rufous dash on them.

From Walsh's description of the ♂, it differs only in having the whole clypeus, all coxæ and trochanters, line on mesonotum, extending into a hook in front, yellowish white; antennæ brown-black, with scape beneath yellowish; and terminal third of segment two and all of segment three of the abdomen, rufous.

Male not seen; female described from two specimens sent me from Algonquin, Ill., by Dr. Nason, who has aided me greatly in finding many of Walsh's species. Whether these females belong with the male type is somewhat doubtful, though probable.

ZOOTREPHES Foerster.

Abdomen black, segments more or less margined with white.
- Pleuræ and sternum honey-yellow ..... **frigidus** Cr.
- Pleuræ and sternum black.
  - Posterior tibiæ fulvous, black at tips; segments of the abdomen with narrow inobscure yellow margins on segment 2 ..... **scapulatus** Prov.
  - Posterior tibiæ entirely fulvous, segments of abdomen with broad yellow margins ..... **mandæ** n. sp.

Abdomen with the segments more or less rufous.
- First segment of the abdomen longitudinally carinated with a groove between.
  - Scutellum yellow ..... **saginatus** Prov.
  - Scutellum black ..... **antennatus** n. sp.
- First segment of abdomen even and oval.
  - Scutellum and base of abdominal segments black . **ichneumonides** Prov.
  - Scutellum black or reddish, segments 3 and 4 always rufous. **montanus** n. sp.
  - Scutellum yellow, segments 2 and 3 rufous ..... **cingulatus** Prov.

Zootrephes frigidus Cr. (*Bassus*), Trans. Amer. Ent. Soc. ii, 111, ♀.

♀.—Length 5.5 mm. Black, with pleuræ, entire sternum and legs, except posterior tibiæ and tarsi, honey-yellow; labrum, tegulæ, base of the segments of posterior tarsi, posterior tibiæ at base and a broad annulus in the centre, white. Thorax and first abdominal segment strongly carinated; the tip of the segment shows some evidence of the cross suture.

Only Mr. Cresson's type from Hudson Bay seen; ♂ not known.

Zootrephes scapulatus Prov. (*Bassus*), Faune Ent. Can. ii, 798, ♀.

♀.—Length 6. mm. Black, robust, with mouth, large orbital lines in front, tegulæ, spot in front, spots above on mesonotum, spot on scutellum and front coxæ, yellowish white. Legs fulvous, with tips of posterior tibiæ and their tarsi fuscous. Metathorax coarsely punctured, areolated, and acicnlated in the large centrax area. Abdomen compressed at the extremity, segments 1, 2 and 3 coarsely punctured; segment 2 with a narrow, rather inobscure, pale yellow line at tip.

Provancher's type, collected at Cape Rouge (near Quebec), Can., is the only specimen known to me.

Zootrephes inconstans n. sp.

♀.—Length 5 mm. Black and shining, except metathorax and first three segments of the abdomen, which are coarsely punctured. Large orbital lines in front, cheeks beneath, scape beneath, sometimes a spot on the front; mouth, except tips of mandibles, tegulæ, spot in front, another beneath, a small line on mesonotum, scutellum, all the trochanters, tips of the coxæ and margins of abdominal segments after the first, light yellow. In some specimens the bands are interrupted in the centre; the bands are broadest on segments 2 and 3, sometimes broad on 4; coxæ and posterior femora black at base, remainder of legs a dusky honey-yellow; antennæ long, pubescent, dark brown. Wings hyaline, stigma large, dark brown. Abdomen, tibiæ and tarsi covered with short, distinct pubescence.

♂.—Stature and sculpture as in ♀. The color markings differ as follows: entire face, four anterior coxæ, triangular spots on prosternum, a crescent extending onto pleuræ back of middle coxæ, line beneath posterior of wings, small spot on scutellum, post-scutellum, and a short line at tip of first abdominal segment, yellowish white. The posterior femora are not black at base.

Described from four female and two male specimens from Washington, Nevada, Colorado and Massachusetts.

Zootrephes saginatus Prov. (*Bassus*), Faun. Ent. Can. ii, 432. ♀.

♀.—Length 4 mm. Head, thorax and basal segment of abdomen, except tip, black; three terminal segments reddish black; remainder of abdomen, most of the legs and antennæ, except basal joint, rufous; posterior coxæ variable with black and yellow, the others and all the trochanters yellow. The head and thorax are marked with yellow as follows: short orbital lines, mouth, tegulæ, line below, spot on mesonotum and scutellum.

♂.—Face, scape, prosternum and a stripe on mesopleuræ yellow, in addition to markings of ♀.

Two female and one male specimens from Canada and New Hampshire.

Zootrephes antennatus n. sp.

♀.—Length 5 mm. Head and thorax black, with narrow orbital lines each side of antennæ; mouth, including clypeus, tegulæ, small spot in front and spot beneath each wing, light fulvous. Abdomen rufous, except basal half of first segment and two terminal segments, which are black. Antennæ entirely rufous, four anterior coxæ and all the trochanters, yellow; remainder of legs rufous. Metathorax more or less rufous. Abdomen broad, clavate, depressed to the fifth segment then compressed; first segment and metathorax with high, coarse carinæ; margins of segments 2 and 3 and all of the following polished.

♂.—Differs only in having the entire face yellow.

Described from two female and two male specimens from Michigan, Illinois, South Dakota and Montana.

Zootrephes ichneumonides Prov. (*Bassus*), Faune Ent. Can. ii, 432. ♀ ♂.

♀.—Length 4.5 mm. Black, with the abdominal segments more or less margined with rufous; mouth, anterior orbits, tegulæ, spot in front, line beneath, line

on mesonotum, spot on scutellum, trochanters and anterior coxæ yellowish white; four posterior coxæ more or less black at base; remainder of legs fulvous. Abdomen depressed, first segment rugose, same of 2 and 3, except tips; segments 2 and 3 with a reddish band on the border.

This species is quite uncertain, and is only provisionally placed here. A female before me that differs in having no yellow markings on mesonotum and scutellum and with segment 4 of abdomen also margined with rufous belongs here, and led me to think that Provancher's species belongs in this genus, although the color markings differ and nothing was said of the carinated metathorax and basal segment of the abdomen. Several male specimens which answer the description have the face smooth and belong to *Promethus*, where the species probably belongs.

Zootrephes montanus n. sp.

♀.—Length 5-6 mm. Head, thorax, base and tip of abdomen black; remainder of abdomen and most of legs rufous. Large spot on centre of front; mouth, tegulæ, spot in front, line below cuneiform line on margins of metanotum, sometimes posterior margin of scutellum, trochanters and four anterior coxæ pale yellow; antennæ reddish brown, scape yellowish beneath; first segment of abdomen, except the tip, sometimes base of second segment, more or less of segment 5, and all of segment 6, black; metathorax faintly carinated, segments 1 and 2 of abdomen aciculated; segments beyond 3, compressed.

♂.—Differs in having the face, scape beneath, and usually all the coxæ pale yellow.

Described from nineteen female and twenty-three male specimens. All from Montana, except two from Nevada and one from South Haven, Mich.

Zootrephes cingulatus Prov. (*Bassus*), Faune Ent. Can. ii, 798, ♀.

♀.—Length 5.5 mm. Black, with abdomen in part rufous; mouth except mandibles at base, large anterior orbits reaching above the antennæ, tegulæ, spot in front, line beneath, line on mesonotum, line between meso- and metapleuræ, pyramidal spot on scutellum, trochanters and extremity of the coxæ, pale yellow; rest of the coxæ black; legs fulvous, posterior tarsi dusky. Abdomen robust, first segment rugose, segments 2 and 3 rufous, and 4 and 5 margined with rufous, remainder black.

♂.—Has scape beneath, entire face, prosternum, crescent on anterior mesonotum, four anterior coxæ and margins of first five abdominal segments, pale yellow.

Female described from Provancher's type; one male from New Hampshire.

SYRPHOCTONUS Foerster.

Posterior tibiæ black, pale at base..... **agilis** Cr.
Posterior tibiæ fulvous, black at tip.
  Pleura rufous, scutellum yellow..... **pleuralis** Cr.
  Pleura and scutellum black..... **robustus** n. sp.
Posterior tibiæ fulvous, tarsi sometimes dusky.
  Abdomen entirely black.
    Face with white orbital lines..... **gillettii** n. sp.
    Face entirely black..... **mellipes** Prov.
  Abdomen black, with segments margined with white....**maculifrons** Cr.
  Abdomen more or less rufous.
    Thorax black..... **pacificus** Cr.
    Thorax red..... **cressonii** n. sp.

Syrphoctonus agilis Cr. (*Bassus*), Trans. Amer. Ent. Soc. ii, 111, ♂.
  Bassus frontalis Cr., ibid. ♀.
  Mesolius junctus Prov., Faune Ent. Can. ii, 797, ♀.

♀.—Length 5 mm. Black, with brown antennæ; spot on front, spot on mandibles, tegulæ, spot in front, line beneath, triangular spot on sides of mesonotum, tip of scutellum, line between meso- and metapleuræ and base of posterior tibiæ, white. Legs, except posterior tibiæ and tarsi, ferruginous.

♂.—Differs in having the entire face, underside of antennæ, entire sternum, front of pleuræ, post-scutellum and two spots at base of third segment of abdomen, yellow. Legs vary from rufous to a light fulvous.

Abdominal segments in the ♀ tend to show more or less signs of rufous, but in the ♂ this characteristic becomes still more marked.

Thirteen female, three male specimens; Illinois, Michigan, South Dakota, New Hampshire, Massachusetts, New Jersey, Pennsylvania, North Carolina and Ottawa, Canada.

Syrphoctonus pleuralis Cr. (*Bassus*), Trans. Amer. Ent. Soc. ii, 111, ♀.
  Bassus syrphicola Ashm., Proc. U. S. Nat. Mus. xii, 439.

♀.—Length 7 mm. Black, with spot on front, mouth, tegulæ, spot in front, broad line on margins of mesonotum, scutellum, post-scutellum, and more or less distinct margins on abdominal segments, yellowish white. Legs, except posterior tibiæ and tarsi, venter, most of pleura and most of metathorax, honey-yellow.

♂.—Same as ♀, but the face, cheeks, antennæ beneath, and the entire ventral and lateral portion of the thorax, except large black spot beneath wings, are yellowish white.

Two female and one male specimens from California and Ohio.

Syrphoctonus robustus n. sp.

♂.—Length 7.5 mm. Black, with face, antennæ beneath, spot on cheeks, mouth and tegulæ, light yellow. Legs honey-yellow, except tips of posterior tibiæ and tarsi, which are nearly black. The entire body is rather coarsely punctured, with metathorax and first three segments of abdomen particularly so. Basal segment of abdomen with an elliptical ridge reaching nearly to the tip: segments of abdomen broad, depressed, narrowing at the tip after the third segment; antennæ reddish brown above. Wings hyaline with stigma and veins, except costal at base, brown.

Described from one specimen from Washington. Type in the Cresson collection.

Syrphoctonus gillettii n. sp.

♀.—Length 4.5 mm. Black, shining, with short yellowish pubescence; broad orbital lines in front, mouth, tegulæ, spot in front and line beneath each wing, yellowish white. Legs honey-yellow; ocelli prominent; antennæ black, reddish brown beneath. Wings hyaline, stigma and veins brown. Head and mesothorax very broad; metathorax, all of first and second abdominal segments and basal half of the third and fourth, coarsely and deeply punctured; segments of abdomen about equal width throughout.

Described from one female sent by Prof. C. P. Gillette, of Colorado, to whom I take pleasure in dedicating this species.

Syrphoctonus mellipes Prov. (*Bassus*), Add. Faune Hymen. 129.

♀.—Length 3.7 mm. Black, with legs pale yellow; metathorax bicarinate; first segment of abdomen aciculated and second punctured.

Canada. Type not seen, but probably does not belong here.

Syrphoctonus maculifrons Cr. (*Bassus*), Proc. Ent. Soc. Phila. iv, 272, ♀.
Bassus semifasciatus Walsh, Trans. St. Louis Acad. iii, 87, ♂.

♀.—Length 5–7.5 mm. Black, with a spot beneath antennæ, triangular spot on each side near eyes, mouth, tegulæ spot in front, line beneath, cuneiform line on mesonotum, scutellum, post-scutellum, and interrupted margins on abdominal segments, yellowish white. Legs rufous, except posterior tarsi, which are nearly black.

♂.—Has face, scape beneath, cheeks beneath, four anterior coxæ and trochanters, crescent on mesosternum and longitudinal dash on pleuræ, yellowish white; other markings as in ♀.

Fourteen specimens from California, Nevada, Colorado, Montana and Illinois.

Syrphoctonus pacificus Cr. (*Passus*), Proc. Acad. Nat. Sci. 1878, 376, ♀.
Bassus xanthopsis Ashm., Proc. U. S. Nat. Mus. xii, 440, ♂.

♀.—Length 5–6 mm. Black, with the central part of abdomen rufous; oblong spot on front, mouth, tegulæ, spot in front, line beneath, large cuneiform spot on margins of mesonotum, stripe between meso- and metapleuræ; trochanters and more or less of coxæ, yellowish white; most of posterior coxæ and base of the others, black; remainder of legs rufous. Abdomen, with tip of segment 2, all of segment 3, and more or less of segment 4, rufous; segments 1 and 2 roughly sculptured.

♂.—Differs in having the entire face, scape beneath, prosternum, anterior margin of mesosternum continuing onto pleuræ, longitudinal stripe on lower mesopleuræ, more or less of four anterior legs and a more or less distinct yellow band or two dots at base of third abdominal segment, yellowish white; fourth and fifth segments of the abdomen usually black, margined with rufous.

Two female and seven male specimens from California, Nevada, Washington and Vancouver's Island.

Syrphoctonus cressonii n. sp.

♀.—Length 6 mm. Rufous, except head, posterior tarsi and segments of the abdomen beyond the third, which are reddish black. The following are yellow tinged with red: large central spot beneath antennæ on front, clypeus, mandibles, except teeth, which are black, palpi, tegulæ, spot in front, lines on margin of mesonotum, scutellum and post-scutellum. Wings hyaline, stigma large, brown; first three segments of abdomen finely punctured, the second somewhat aciculated at the sides. The form is broad, plump and short; antennæ wanting.

Described from one specimen from Nevada. This specimen is in the Cresson collection, and is dedicated to Mr. E. T. Cresson for the many kind favors shown me in the study of this tribe.

ENIZEMUM Foerster.

Enizemum tibiale Cr. (*Bassus*), Trans. Amer. Ent. Soc. ii, 110, ♀.

♀.—Length 6 mm. Black, with mandibles, palpi, costæ, tegulæ, faint line beneath, spots on margin of mesonotum, parallel capillary lines back of scutellum and post-scutellum, more or less of trochanters and base of posterior tibiæ, white; posterior tarsi, tibiæ, except base, and tips of femora black; remainder of legs, labrum, mesonotum, with lower part of pleuræ and scutellum, honey-yellow; antennæ brown. Wings slightly dusky. Abdomen with segments 1 and 2 and most of 3, coarsely punctured, rugose, and coarsely aciculated at the base of the segments; two marginal and two central carinæ on segment 1, the two latter extending close together about half the length of segment 2.

♂.—Differs in having the sternum and scutellum black; the entire face, scape beneath, prosternum, anterior part of mesonotum, trochanters and four anterior coxæ, yellowish white; rest of legs fulvous (except posterior tibiæ and tarsi, which are the same as with the ♀) and the three basal segments of the abdomen, which are coarsely longitudinally aciculated. This last character, with the different color markings, may make a new species when more material has been examined.

Three female and one male specimens from Illinois, Montana, Colorado and Canada.

HOMOTROPUS Foerster.

Abdomen black, or with yellow markings.

Posterior coxæ black, or black and yellow..... **humeralis** Prov.

Posterior coxæ same color as femora.

♀ with yellowish white capillary lines on scutellum and post-scutellum, and face without spot; ♂ without yellow markings on the abdomen. **bicapillaris** Walsh.

♀ with sides of scutellum and usually the capillary lines yellowish white, face with white spot; ♂ with yellowish white band or spots at base of third abdominal segment..... var. **albopictus.**

Abdomen more or less rufous.

Face without orbital lines (♀)..... **pallipennis** Prov.

Face with orbital lines (♀) or entirely yellow ♂..... **decoratus** Cr.

Homotropus humeralis Prov. (*Bassus*), Faune Ent. Can. ii, 429, ♂.

Bassus fuscitarsus Prov., ibid. 430, ♀.

♀.—Length 6 mm. Black, with elongate spot on face, sometimes obscure or-

bital lines, mouth, tegulæ, spot in front, line below, cuneiform band on margins of mesonotum, tip of scutellum and band between meso- and metapleuræ, yellowish white. Legs ferruginous, coxæ black and yellowish white; posterior tarsi and tips of tibiæ fuscous. Abdominal segments 1, and 2 and 3 at base finely rugose; tips of segments obscurely margined with red in some specimens.

♂.—Differs in having the face, scape beneath, prosternum, stripe on front of mesopleuræ, four anterior coxæ and trochanters, and two spots or a band at the base of third abdominal segment, yellowish white. In a few specimens this band is absent, while in others there is also a band at the base of the fourth segment.

Fourteen female and forty-six male specimens from S. California, Nevada, Washington, Colorado, Montana and Canada.

Homotropus bicapillaris Walsh (*Bassus*), Tr. St. Louis Acad. iii, 88, ♀.
Bassus belangeri Prov., Faune Ent. Can. ii, 430, ♀.
Bassus pectoralis Prov., ibid. 431, ♂.

♀.—Length 6 mm. Black, mouth, tegulæ, spot in front, line beneath, broad line on margins of mesonotum, line between meso- and metapleuræ and two capillary lines extending from wing to wing, passing over the tips of scutellum and post-scutellum where they become somewhat broadened, yellowish white; pleuræ, scutellum and clypeus have a tendency to be more or less rufous. Legs pale rufous, with posterior tarsi and tips of tibiæ, black. Abdomen with first segment scabrous and base of second coarsely aciculated, remainder of segments finely punctured; metathorax with long white pile.

♂.—Differs in having the face, scape beneath, band on anterior part of mesosternum, extending onto pleuræ, and four anterior coxæ and trochanters yellowish white.

Four female and one male specimens from Colorado, Illinois, New Hampshire and Canada.

Var. **albopictus** differs in the female having a large white spot on the front and the sides of the scutellum yellowish white, and in the ♂ having, besides the markings on the sides of the scutellum, a yellowish white band at the base of the third abdominal segment. The first abdominal segment varies from finely scabrous to coarsely aciculated.

Described from six female and three male specimens from Colorado, Washington, Canada and Michigan.

This may be a separate species, but as the specimens are so variable in the above markings, it seems best to only make them a variety of *bicapillaris*.

Homotropus pallipennis Prov. (*Bassus*), Faune Ent. Can. ii, 431, ♀.

♀.—Length 5.5 mm. Black, with abdominal segments 2, and 3 and 4 at tip at least, ferruginous; mouth, small spot in front, costæ, tegulæ, spot in front, line beneath, cuneiform line on margins of mesonotum, scutellum, post-scutellum with capillary line to wings, suture between meso- and metapleuræ, trochanters and four anterior coxæ yellowish white; posterior coxæ black, tipped with yellow; tips of posterior tibiæ and their tarsi dusky; remainder of legs honey-yellow. Wings hyaline, stigma yellowish brown; antennæ brown. Abdomen closely and finely punctured.

Description taken from Provancher's type and from one specimen in Mr. Cresson's collection, both females and from Canada; ♂ not known.

Homotropus decoratus Cr. (*Bassus*), Proc. Acad. Nat. Sci. Phila. 1878, 375, ♀.

♀.—Length 6 mm. Head and thorax black; abdomen, except base and tip, rufous: anterior orbits, scape beneath, spot below, mouth, tegulæ, spot in front, line beneath, cuneiform line on margins of mesonotum, posterior margin of scutellum and most four anterior coxæ light yellow; remainder of legs, except posterior tarsi, which are dark brown, rufous.

♂.—Differs in having the entire face, marginal lines on mesonotum recurved into parallel lines above, transverse and longitudinal lines on mesosternum and mesopleuræ and all coxæ and trochanters light yellow. The abdomen usually has more black on it in the ♂.

Eighteen female and seven male specimens from Nevada and Southern California.

LIST OF BASSINI.

BASSUS Grav.

1. lætatorius Fabr.
   tripicticrus Walsh.
   a. sycophanta Walsh.
   b. terminalis Davis.
2. orbititalis Cr.
   cinctulus Cr.
   albicoxis Prov.
   amœnus Prov.
   orbitalis Ashm.
3. scutellaris Cr.
4. concinnus Cr.
5. pulchripes Prov.

PROMETHUS Foers.

1. costalis Prov.
   longicornis Prov.
   aciculatus Prov.
   auriculatus Prov.
2. elongatus Prov.
3. ruficrus Walsh.

ZOOTREPHES Foers.

1. frigidus Cr.
2. scapulatus Prov.
3. inconstans Davis.
4. saginatus Prov.
5. antennatus Davis.
6. ichneumonides* Prov.
7. montanus Davis.
8. cingulatus Prov.

SYRPHOCTONUS Foers.

1. agilis Cr.
   frontalis Cr.
   junctus Prov.
2. pleuralis Cr.
   syrphicola Ashm.
3. robustus Davis.
4. gillettii Davis.
5. mellipes* Prov.
6. maculifrons Cr.
   semifasciatus Walsh.
7. pacificus Cr.
   xanthopsis Ashm.
8. cressonii Davis.

ENIZEMUM Foers.

1. tibiale Cr.

HOMOTROPUS Foers.

1. humeralis Prov.
   fuscitarsus Prov.
2. bicapillaris Walsh.
   belangeri Prov.
   pectoralis Prov.
   a. albopictus Davis.
3. pallipennis Prov.
4. decoratus Cr.

* Only provisionally placed in the genus.

Bassus arcolatus Prov. = Lampronota punctulata.
" *bouleti* Prov. = Erromenus pedalis.
" *cylindricus* Prov. = Pimpla annulipes ♂.
" *dorsalis* Prov. = Plectiscus.
" *gibbosus* Say = Microdus.
" *limitaris* Say = Earinus.
" *sanctus* Say = Microdus.
" *unicus* Ashm. = Tryphon.
" *virginiensis* Ashm. = Tryphon.

DESCRIPTIONS OF A FEW NEW PIMPLINÆ.

BY G. C. DAVIS.

Lampronota sexcarinata n. sp. ♀.—Length 10 mm.; ovipositor 8 mm. Body entirely black, except margins of abdominal segments, which are sometimes rufous and covered with fine yellowish hair most conspicuous on the front and the least so on the abdomen; antennæ slender, reddish brown. Legs honey-yellow, posterior tibiæ and tarsi dark brown. Wings hyaline, nervures and stigma brown, tegulæ rufous to yellow, areolet wanting; parapsidal grooves distinct on mesonotum, converging into a broad, thickly punctured depression in front of scutellum; metathorax rugose and with six longitudinal carinæ, the two outer ones running just below the oblong spiracles; first segment of abdomen rugose, oval near base; segments 2 and 3 finely punctured.

Described from four female specimens taken in Michigan.

Lampronota angusta n. sp. ♀.—Length 7 mm.; ovipositor 7 mm. Body black, thickly punctured; orbital lines from vertex to insertion of antennæ, clypeus, base of mandibles, palpi, tegulæ, triangular line on margins of mesonotum, anterior coxæ and four anterior trochanters pale yellow; remainder of legs rufous, except four posterior tarsi, tibiæ, all but base, and base and tip of femora, which are dark brown, tarsal claws small; antennæ slender, black. Wings hyaline, areolet small, triangular; occiput full, ocelli elevated; front with a central carina extending from antennæ to clypeus; mesonotum dull, closely punctured, without parapsidal grooves; metanotum rugose, without carina; first segment of the abdomen coarsely rugose with a central longitudinal carina, second and most of third segment finely rugose.

Described from one female taken in July at the Michigan Agricultural College.

Lampronota bullata n. sp. ♀.—Length 11 mm.; ovipositor 5 mm. Black, with abdominal segments 2 and 3, in part, rufous. Head, thorax and legs coarsely punctured and covered with sparse, long, white pile; antennæ black, the front with a broad elevated ridge extending from their base to the clypeus; scutellum elevated, prominent; with a shining tubercle at the tip. Wings yellowish, dusky; areolet present, petiolate, with a large bulla on the outer vein at base so that it makes the areolet appear incomplete. The upper third of the second recurrent nervure is also covered with a bulla and is peculiar in that it has a branch about one-third mm. long extending out toward the apex of the wing in this bulla.

The abdomen is quite broad, sub-compressed at apex, shining, first segment punctured at sides, 2 and 3 rufous, with sides and more or less of a band across the middle of the segments black; four anterior legs with the tibiæ and tarsi dirty fulvous; posterior legs with base of the tibiæ and tarsal joints, beyond the middle of the second, dirty white.

Described from one female sent by Prof. O. B. Johnson, Seattle, Washington.

Lampronota bibrevicincta n. sp. ♀.—Length 11.5 mm.; ovipositor broken. Head and thorax black, abdomen mostly rufous; two short orbital lines on front, light yellow; clypeus, mandibles and palpi ferruginous; coxæ, trochanters and posterior tibiæ and tarsi black; remainder of legs rufous. Wings yellowish fuscous; areolet medium petiolate. Head and thorax coarsely punctured; metanotum without carina. Abdomen shining, sparsely punctured, segments 1 and 2 with a slight central longitudinal depression; segment 1 black, with the terminal fourth rufous, 2 and 3 entirely rufous; following segments more or less stained with black.

Described from one female taken at the Michigan Agricultural College. It comes nearest to *L. montana*.

Lampronota nigropicta n. sp. ♂.—Length 10 mm. Black, with the following parts lemon-yellow: entire face below anteunæ, scape beneath, mouth, prosternum, line on collar, small spot on margins of mesonotum, tegulæ, spot in front, spot beneath, scutellum, apex of first abdominal segment, second segment,, except a black spot in the centre, all of third segment, base of fourth, four anterior legs and tarsi, trochanters, basal two-thirds of tibiæ and base of femora of hind legs: antennæ brownish fulvous, growing lighter toward the tip. Wings hyaline, without areolet. Thorax and abdomen shining, finely and sparsely punctured; spiracles on basal segment of the abdomen not tuberculate.

Described from one male taken at the Agricultural College, Mich.

Lampronota annulata n. sp. ♂.—Length 11 mm. Black, with yellow markings; entire head, except occiput, and vertex around ocelli, entire sternum, prothorax above, lines on mesonotum bordering the entire sides and returning parallel half way to the scutellum, tegulæ, spot in front, spot below, line between meso- and metapleuræ, scutellum and post-scutellum lemon-yellow; posterior coxæ lemon-yellow with a black stain above. Abdomen with segment 1 black, except two fulvous spots on apical margin; segment 2 reddish black, with two spots at base and a broad apical margin light ferruginous; segments 3 and 4 entirely ferruginous, and the remainder reddish black. First segment grooved at base, spiracles tuberculate; antennæ dark brown, with scape beneath and a broad annulus above, lemon-yellow. Wings yellowish hyaline, areolet wanting; mesonotum punctured, rufous and black; pleuræ with a slight rufous tinge; metathorax rugose, not carinate.

Described from one male taken at Gaylord, Michigan.

Lampronota pallorana n. sp. ♀.—Length 11 mm.; ovipositor 11 mm. Pale rufous, with yellowish white markings; antennæ black, with segments 10 to 15 white, scape beneath rufous; orbital lines, lower part of front, mouth, cheeks, gula, entire prothorax with anterior coxæ, mesopleuræ, tegulæ, spot in

front, line beneath, parallel lines on mesonotum and scutellum, yellowish white; metapleuræ and middle coxæ are a yellowish red; remainder of legs honey-yellow. Abdomen smooth, shining, dark rufous. Wings hyaline, nervures and stigma yellowish; areolet large, triangular. Thorax coarsely punctured.

Described from one female taken at Philadelphia, Pa., by Chas. W. Johnson.

Xylonomus mandæ n. sp. ♀.—Length 17 mm.; ovipositor 10 mm. Dark reddish brown, with abdomen, beyond first segment, black; anterior orbital lines, tubercles on pronotum, line beneath tegulæ, band on each side of scutellum and base of stigmæ yellowish white; four anterior legs and trochanters of posterior legs ferruginous; metathorax and basal segment of abdomen rufous, tuberculated at sides; antennæ reddish brown, with scape beneath lighter; checks behind eyes, propleuræ and most of mesonotum, coarsely aciculated; anterior upper angles of prothorax tuberculate; metathorax areolated, scabrous. Wings hyaline, with dusky yellowish spot at the juncture of the cubitodiscoidal and submarginal, at the juncture of the submedian with the cubitodiscoidal cells and at the apex of the anal cell; basal segment of abdomen scabrous; remainder finely punctured; venter more or less reddish.

Described from one female from Prof. O. B. Johnson, at the Washington University, and at his suggestion named as a compliment to one of his most faithful collectors.

Echthrus adillæ n. sp. ♂.—Length .20 mm. Black, with head and thorax coarsely punctured, and abdomen finely punctured. Head pilose, deeply excavated back of antennæ; antennæ brown-black, basal joint large, nearly as broad as long; mandibles and palpi rufo-piceous; mesonotum with distinct parapsidal grooves; metanotum scabrous, aciculated above base of abdomen, with a central longitudinal depression. Abdomen smooth, somewhat compressed, with a small depression on basal segment. Wings yellowish hyaline, areolet large, pentangular, four anterior legs from the terminal part of the femora rufo-fulvous; posterior tibiæ and basal two-thirds of first tarsal joint rufo-piceous, rest of tarsi reddish white.

Described from one specimen, from Washington, in honor of another of Prof. Johnson's enthusiastic workers.

Aplomerus nasonii n. sp. ♂.—Length 8 mm. Black; thorax and abdomen decidedly depressed; orbits broken below the eyes, at the insertion of antennæ and broadly so on the vertex; clypeus, two dots above on front, base of mandibles, palpi, tegulæ, base of all the tibiæ, anterior tarsi and basal half on first tarsus of four posterior tarsi, yellowish white; remainder of four anterior legs honey-yellow, and of posterior legs picco-fulvous; antennæ brown. Wings hyaline, without areolet, nervures and stigma reddish brown. Thorax broad, flat; parapsidal grooves distinct; metanotum with small longitudinal carinæ; first segment of the abdomen twice as long as the rest, subpetiolate, gradually expanding; posterior femora only two-thirds as long as tibiæ and very robust.

Described from one male sent by Dr. Nason, of Algonquin, Ill., and dedicated to him in recognition of the many fine specimens sent me from that State.

CONTRIBUTIONS TO THE DIPTEROLOGY OF NORTH AMERICA.—I. SYRPHIDÆ.

BY C. H. TYLER TOWNSEND.

It is proposed, in a series of papers under the above caption, to give notes and descriptions of North American Diptera in the Townsend collection, which now forms a part of the University of Kansas collection of Diptera. The present paper treats of the Syrphidæ, seventy-five species being enumerated. It is unnecessary to more than point out the use of describing specimens from different localities, showing wherein they differ from the original description, as I have done. By this means variations are tabulated, and the limits of species determined.

All of the types herein described are to be found in the University of Kansas collection, as well as all others heretofore described by the author.

1. **Microdon bombiformis** n. sp.

Length 13 mm. (with abdomen flexed under); actual length 14 mm. Differs from Williston's description of *tristis* as follows: Front and face of equal width, metallic green, clothed with pale brassy-yellow pile; transverse groove of front distinct. Dorsum of thorax, pleuræ, scutellum, and first and second segments of abdomen shining green, clothed with the same pale brassy-yellow pile, which is thickest on scutellum and thorax. Scutellum slightly emarginate behind, the corners corresponding to the spines being obtusely angular. Rest of abdomen short, black, hairy, more apparent on sides of third segment. Third segment deep, soft black, but shining, with a slight greenish lustre. Fourth and fifth segments uniformly black and shining, with a purplish lustre; ovipositor pale brownish, exserted. The abdomen is but little longer than wide. Legs black, only black hairy, but the hairs of tibiæ and tarsi show a golden reflection in oblique lights; tips of tarsi more brownish. The legs are stout, and the hind metatarsi are rather broad, but hardly more so than the other joints. Pulvilli and base of claws yellowish. Wings with all the veins broadly and evenly clouded with flavous smoky; the narrow spaces left are nearly hyaline.

Dixie Landing, Va. (near Washington, D. C.) June 1. One ♀.

I can hardly identify this with *megalogaster* Snow, from the difference in the wings.

2. **Microdon fuscipennis** Macq., Williston.

Williston describes only the male. The female differs as follows from his description:

Length 8.5 mm. Face and front very wide; face clothed with yellowish brown pile, except a lighter patch above on sides. Front not quite one-half the width of head, clothed with yellowish pile above and on sides, shining brown and bare next base of antennæ. Antennæ yellowish brown; whole head and body brown, the abdomen dark brown. Dorsum of thorax with four blackish vittæ, the vittæ clothed with black pile. Scutellum dark brown, strongly emarginate on apex. Hind femora, tibiæ and metatarsi blackish, knees narrowly pale yellowish; middle and front femora and tibiæ, brown; knees and bases of tibiæ lighter brownish. All the tarsi (except hind metatarsi) light brownish or yellowish brown. Hind metatarsi a little longer than the other joints together, thickened, very distinctly widened, but not as wide as in the male. Wings strongly fuscous, a little lighter on inner portions, but still uniformly infuscated. In the left wing the stump of vein in first posterior cell unites with a stump from the fourth vein, and is thus continued entirely across the cell, dividing it into two cells. Only a trace of this abnormal stump of fourth vein is present in the right wing.

Rock Creek, near Washington, D. C., June 15. One female.

3. **Microdon violens** n. sp.

Length 10 mm. Almost wholly light violaceous. Face brilliant vivid green, with violet reflections in oblique lights. Front dark green with violet reflections, vertex violet. Dorsum of thorax violet, with green on disc, but whether in vittæ is not apparent from bad preservation; whole abdomen and scutellum of a bright violet, with almost no green, blue, or coppery reflection. Scutellum with two not widely separated spines. Legs yellowish brown, with basal half of femora and last joint of tarsus (posterior) blackish. Wings nearly hyaline, with veins of anterior outer portions very faintly clouded.

Jamaica (Bowrey). A single specimen, apparently a female.

The face is whitish pilose. Antennæ brownish, third joint longer than first two together. Front but little less than one-third width of head. This is the first *Microdon* recorded from the island of Jamaica. I have examined the descriptions of all the South American species, including Walker's, and all the North American and Mexican species, but am unable to identify this specimen with any of them. The following species with predominating violet reflections, and especially with the face green, preclude my referring it to them for the reasons named:

M. aurifex Wd., *inæqualis* Lw., *splendens* Wd., Willist., differ in having the spines of scutellum widely separated.

M. lætus Lw. differs in the tarsi of both sexes being black.

M. cyaniventris Mcq. differs in having a stump of a vein on last section of fourth vein and on vein closing discal cell, according to Macquart's figure.

M. violaceus Mcq. has scutellum without spines.

M. opulentus Big. has scutellar spines long and stout.

M. crassitarsis Mcq. has legs green, with violet reflections.

M. angustus Mcq. has legs with green reflections, and tarsi black.

When I say that the scutellar spines are not widely separated, I mean that they are not nearly so remote as shown in v. d. Wulp's figure of *M. aurifex* in the Biol. Cent.-Am., Dipt. iii.

4. **Microdon viridis** Towns.

San José del Cabo, Baja, Cal. (Cal. Acad. Sci.). One female. See description in Proc. Cal. Acad. Sci., 1894.

5. **Microdon xanthopilum** Towns.

California (Acad. Sci.). Two, ♂ ♀. Differs from *megalogaster* Snow by having abdomen yellowish pilose. For description see Proc. Cal. Acad. Sci., 1894.

6. **Chrysotoxum derivatum** Walk.

Fort Collins, Colorado (Gillette). One male I refer to this species. It is 15.5 mm. long, not including antennæ. The pile of thorax seems to be all yellowish. The yellow on fifth segment encloses an inverted Y-shaped marking, the base of the Y being confluent with the narrow anterior black border of the segment. The yellow of second to fourth segments agrees with Williston's description.

7. **Chrysotoxum laterale** Loew.

Guanajuato, Mex. (A. Dugés). One male. This specimen is apparently the same as those from Mexico mentioned by Williston in the Biol. Cent.-Am., Dipt. iii, p. 5. It is nearly 12 mm. long, and agrees in all the particulars there mentioned. Scutellum yellow, disc glassy, but nearly concolorous. Margin and base of venter rather broadly yellow, the posterior margin of segments yellow, third and fourth with a pair of yellow spots. Frontal triangle black, narrowly yellow pollinose on sides.

8. **Chrysotoxum pubescens** Loew.

Constantine, Mich., August 31, one female. Dixie Landing, Va., May 30, one male. I refer these here rather than to *ventricosum* because they agree in size and the coloring of the legs, though the black of fifth segment forms an inverted Y and not a V. I believe the coloring of the legs is a better specific character than the interruption or non-interruption of the band of fifth segment, especially when combined with size. The length of these two specimens is 12 mm. The second joint of antennæ is longer than the first, but the third joint is no longer in the male than in the female. In all other respects they both agree closely with Loew's description.

9. **Chrysotoxum ventricosum** Loew.

San Francisco Mountain, Arizona, July 15. One male and two females. These I refer here rather than to *integre*, because of the coloring of the legs, though in two of the specimens (♂ ♀) the second and third bands are entire, and in one of these (♀) the fourth band also. Thus two of them have an inverted Y-shaped marking on fifth segment, and the other a V-shaped. The scutellum is black across the disc. The fasciæ are narrower than in *pubescens* and *deviratum*, thus showing more black on second and third segments. Length 10–11 mm. The pile at base of abdomen is yellowish, not black, thus agreeing with *C. arcuatum*, of Europe, according to Loew. There is no yellow on hind margin of second segment, or only the slightest trace in one (♀). They otherwise agree with Loew's description.

10. **Paragus bicolor** Fabr.

Las Cruces, N. Mex., August 19; one female. Length 5 mm. Thorax, scutellum, and basal angles of abdomen have a slight greenish lustre, the scutellum margined posteriorly with yellowish white. Abdomen wholly pale red, except these lateral basal angles dark greenish. The very short white pile is not only apparent on sides and on fifth segment, but also extends across second, third and fourth segments in an anterior band, the posterior half (more on fourth) showing the band of very short black pile. Legs wholly pale reddish, except tips of femora and bases of tibiæ, light yellow.

11. **Chrysogaster nitida** Wied.

Dixie Landing, Va., and Washington, D. C. May 23 and 27, two males; October 11, one female. The female and one male agree well with descriptions. The other male has the fourth vein terminating nearly opposite the end of second, and the frontal triangle is more finely rugose, yet I would prefer to consider it the same species.

12. **Chrysogaster pulchella** Willist.

Constantine, Mich., September 1, one female. Length 5.5 mm. Antennæ longer than face, second joint fully half as long as third. Front and face with a coppery reflection; otherwise agrees well with description.

13. **Syrphus** n. sp.?

Fort Collins, Colorado (Gillette); one female. I would refer it to *S. pauxillus* Willist. but for the great disparity in size. That

species is 7 mm. (with some specimens measuring 9 mm. referred here by Snow), while the present specimen is 13 mm. The front is yellow, with a darker reflection; vertex black. Facial stripe narrow, obsolete above tubercle; cheeks blackish posteriorly; pile of thorax yellowish. Yellow markings of abdomen agree in all particulars with Williston's description of *pauxillus*, but there are no spots on front angles of fifth segment. Legs reddish yellow, base of front and middle femora and all of hind femora except tip, black. Wings hyaline; stigma elongate, flavous, occupying all of third costal cell, except a small clear portion in middle just before end of auxiliary vein.

14. **Sphærophoria** n. sp. (?)—aff. *cylindrica* Say.

One female differs from *S. cylindrica* as follows:

♀.—Length about 6 mm.; of wing, 5 mm. Face wholly light yellow, cheeks with a blackish line bordering lower margin of eyes, oral margin narrowly blackish on edge. Front black, but the yellow of face extends up on each side about half the length of front. Pleuræ greenish yellow above, shining greenish black below. Abdomen deep shining black, a slightly interrupted yellow band across second segment; a similar, but entire yellow band across third and fourth segments, that on fourth situated more anterior to middle of segment. Fifth segment with a decidedly interrupted (in middle) yellow band near front border, the inner ends of the yellow being swollen. Sixth segment yellow, with five blackish spots. Seventh segment yellowish, brownish on median base. Venter and legs light yellow, the hind tarsi brown, middle and front tarsi with a slight brownish tinge. Wings hyaline, longer than abdomen, stigma pale yellow.

Fort Collins, Colorado (Gillette).

This comes near to Williston's var. (*c.*) ♀ from New England, mentioned in his description of *S. cylindrica* (see monogr. p. 105). It may be the ♀ of this species.

15. **Baccha clavata** Fabr.

Bath, Jamaica (E. M. Swainson). One male I identify as this species. The face, however, has a steel-bluish ground color, being whitish pollinose on sides, but showing a bluish reflection. First abdominal segment is blackish, but with a bluish reflection. Vertex bluish black. Dark portions of abdomen, except first segment, opaque brown. Length nearly 10 mm.; otherwise agrees well with Williston's description of *B. babista* Walker, which is a synonym. The facial tubercle, however, is not so strongly pronounced as in Williston's figure of the head of *babista* ♀. The scutellum is brownish yellowish, with a slight metallic greenish reflection.

Las Cruces, N. Mex., June 7; one female. This specimen seems quite different from the Jamaica male, having the face clear creamy yellowish without any bluish reflection whatever. The scutellum is yellow, and very plainly brown across disc in a transverse band. All the black portions of abdomen shining black. Length only 8 mm.

Two other specimens, ♂ ♀, in Mr. C. B. Taylor's coll. agrees well with description. They are from Constant Spring, near Kingston, Jamaica, December 9.

C. W. Johnson (in MSS.) has taken and identified this species from Rock Fort, near Kingston, Jamaica.

16. **Baccha lemur** O. Sack.

Las Cruces, N. Mex., June 7; one male. It agrees well with description. Length 9 mm. Face and frontal triangle wholly metallic greenish black, faintly whitish pruinose on sides, with no yellowish; halteres with darker knobs. Abdominal cross bands light blood-reddish. Femora and tarsi more brownish. The cross band of wings extends posteriorly to anal cell, which it does not quite touch, following along the outer side of the posterior cross-vein at distal end of second basal cell. Extreme proximal end of submarginal cell with just a trace of hyaline in the angle. This is apparently the case with Osten Sacken's specimens, but is not quite clear from the descriptions.

17. **Baccha sagittifera** Austen.

Cinchona, 5000 feet, Jamaica. Described by Mr. E. E. Austen, of the British Museum, in Proc. Zool. Soc. London, 1893, pp. 144–145, pl. iv, fig. 14, from a single female, taken in June.

18. **Baccha tarchetius** Walk.

Dixie Landing, Va. (near Washington, D. C.). One male, August 19. Length 10 mm. Agrees well with Williston's description, except as follows: Hind tarsi wholly, other tarsi on distal half, brownish. The dark brown anterior border of wings fills out the first basal cell (not the first posterior) and just enters the proximal end of the first posterior, thus passing a little beyond the anterior cross-vein, thence along, but not exceeding (and at first not quite touching) third vein to tip of wing. In addition to the hyaline spot in marginal cell, there is a faint, interrupted, hyaline streak in submarginal cell, nearly obsolete, except posteriorly in the left wing.

19. **Ocyptamus dimidiatus** Fab.

Kingston, Jamaica. One female, taken March 18, in coll. C. B. Taylor. Length 7 mm. The abdomen has a purplish reflection.

20. **Ocyptamus fuscipennis** Say.

Jamaica (Bowrey); one male. Agrees well with Williston's description. The subapical hyaline triangle of the wings is normal, the rest of the wings wholly brown, with two or three faint and short streaks near middle, the axillary and anal (angle) regions paler.

A female in Mr. C. B. Taylor's coll., taken in Kingston, April 12, appears to belong to the var. *fuscipennis* Mcq., the proximal half of the discal cell being hyaline.

21. **Ocyptamus iris** Austen.

Cinchona, 5000 feet, Jamaica. One female, taken in June, is described under this name by Mr. E. E. Austen, of the British Museum, in Proc. Zool. Soc. London, 1893, pp. 133–134, pl. iv, fig. 1.

22. **Rhingia nasica** Say.

Fort Pendleton, W. Va. (Pergande), September 7. One male. Roslyn, Va., August 21, one male. The face is rather brownish yellow, or yellowish. Scutellum in one is shining black on sides, not on base; in the other black on sides and base. Wings with a flavous tinge anteriorly.

23. **Volucella abdominalis** Wied., Auss. Zweifl. ii, 196.

Jamaica (Bowrey). Seven specimens, two females and five males. Bath (Swainson). There is considerable difference in size and some in coloring between the specimens, but I am inclined to refer them all to the same species. The smallest (two males) are 13 mm., but most of them are larger (one is 14 mm., and the other four are 15 mm.).

Length 13–15 mm. Sides of thorax, pre-scutellar marking and scutellum light brown, in some cases (two small males) nearly flavous. The males have disc of thoracic dorsum shining black, but in the females it is more reddish. Abdomen cupreous brown (smaller males) or shining violaceous bluish, venter concolorous. Wings are flavous on anterior portion of basal half, with a moderately square, brown, or dark brown stigmal marking. This marking is, however, in four of the males only flavous.

This is the species mentioned by Cockerell on p. 259 of vol. i, Journal Inst. Jamaica, as "*Volucella spiniger* [British Museum]." Though the specimens seem to have been so determined at the British

Museum, still I am confident that they are *abdominalis* Wied., and not *spinigera* Wd. (for descr. of latter see Wd., Auss. Zw. ii, 197–98).

Specimens in C. B. Taylor's coll. Jamaica.

In MSS. Mr. C. W. Johnson identifies two specimens which he took in Kingston as *V. purpurascens* Loew., but they are doubtless this species.

24. **Volucella anna** Willist.

Williston's description is drawn from a single male. The female differs as follows, according to my specimen:

Length slightly over 13 mm. Antennæ light brown, first joint black. The third joint resembles the description given by Williston for the females of *V. comstocki*, as on its widest part it is nearly twice as wide as on its narrowed portion. Front and vertex light brown, yellowish or golden whitish pilose, ocellar spot black. Dorsum of thorax with considerable yellowish pile anteriorly. Scutellum with a milky bluish reflection in oblique lights, and somewhat the same reflection on abdomen. Costal cells not so brown, slightly flavous at base and just distad of the small brown stigma. Clouds on cross-veins, and furcation of veins two and three very faint.

Las Cruces, N. Mex. One female taken on flowering shrub on mesa, April 18.

25. **Volucella apicifera** n. sp.

Length 14 mm. ♀. Whole face and front pale whitish yellow, a rather faint stripe on cheeks light brownish, no facial stripe, ocellar spot blackish. Antennæ wholly yellowish red, third joint moderately notched and much widened basally, arista plumose above, but only shortly so below. Face with short yellowish pile, front with the yellow pile mixed with black, especially at vertex. Face nearly straight, receding conically below, tubercle not developed. Very near *V. isabellina* Williston with the description of which it agrees in the wings, thorax and abdomen, except as follows: Parallelogram in front of scutellum, and lateral stripe of thorax, yellowish and very distinct, same color as scutellum, but latter with black pile. Hardly a trace of black in pile of post-alar callosities. The black of thorax has two grayish pollinose median vittæ. Pleuræ thickly whitish yellow pilose. Posterior black margin of second segment not obsolete on middle, quite uniform in width throughout, except rather abruptly widened at lateral ends. The yellow of abdomen very pale whitish yellow. Second segment with a median black vitta running from hind marginal back to anterior margin of segment, uniformly a little widened anteriorly. Third segment shining bluish black, except the anterior border, which is pale whitish yellow, not interrupted, but a little emarginate in middle, a little widened laterally. Fourth and fifth segments wholly shining bluish black. The short, appressed hairs of yellowish portions whitish, of black portions black, except that the fourth segment bears longer whitish but thin pile, with a patch of short white pile on sides at anterior angles, rest of sides with black pile. Venter nearly corresponding to dorsum in coloration, the posterior black border of second segment much widened in middle and abbreviated on sides, the black of third segment reaching anterior margin in

middle, and thus narrowly interrupting the yellow anterior border. Legs wholly black, the knees and basal half of front and middle tibiæ more yellowish.

Las Cruces, N. Mex., April 7. One female.

An elegant and striking species, which will easily be distinguished from *V. isabellina* by the above characters.

26. **Volucella castanea** Bigot.

Length 13 mm. Face grayish yellow, stripe of cheeks brown, darker below; no facial stripe. Scutellum, parallelogram in front of latter, and lateral stripe of thorax brownish yellow, the scutellum with something of the same reflection as the abdomen; rest of thorax greenish black, shining. Wings flavous on anterior basal portion, with three small clouds near stigma.

Guanajuato, Mexico (A. Dugès); one male. Agrees quite well with Bigot's description, and is with little doubt that species.

The abdomen is darker apically, more purplish on hind margin of third segment, though this may simply be due to discoloration.

27. **Volucella comstocki** Williston.

Las Cruces, N. Mex. One male and two females, April 18. On flowering shrubs on mesa toward Little Mt. (Tortuga). One (female) measures 9 mm.; the other two 10.5 mm. Pile of face is apparently shorter in female than in male, and is lateral in both sexes. First two antennal joints shining black, the third opaque light brown, the second also light brown in one specimen. In speaking of the wings, the "faintly clouded on the outer part and posterior border" of Williston's description consists in my specimens of a little flavous just distad of the small brown stigma.

The third antennal joint in the female is not twice as wide basally as in the narrowed portion.

28. **Volucella estebana** Towns.

San Esteban, L. Cal. (Cal. Acad. Sci.), April, 1889. A pair, ♂ ♀, *in coitu*. For description see Proc. Cal. Acad. Sci., 1894.

29. **Volucella esuriens** Fab.

Las Cruces, N. Mex. One male in valley, August 21, var. *violacea* Say, formerly known as *V. mexicana* Mcq. Face pale chestnut. Less of a violet reflection, more of a blue. Thorax, scutellum and abdomen all nearly concolorous, scutellum hardly lighter, all with a milky bluish tinge. No sign of the prescutellar lighter marking on hind edge of thorax.

Guanajuato, Mexico (A. Dugès). Two males; abdomen of a pale bronzy purplish color.

Baja California (Cal. Acad. Sci.). Numerous specimens from San Josè del Cabo, and other localities.

San Francisco Mt., Arizona. This species was found from the base to the summit, July 15. It was most numerous at base on a large yellow composite; was found on same flower in spruce zone (see Merriam's definition of zones); on beds of low yellow flowers below summit, and last of all on the bare volcanic rocks of the summit itself. Ten specimens (two taken by Mr. Cordley), four females and six males. These are all var. *violacea* Say (formerly known as *mexicana* Mcq.), distinguished by the strong purplish reflections instead of brownish color. It is recorded from California, Arizona, Texas, Florida, Mexico (Mcq.) and New Granada (Mcq.).

30. **Volucella evecta** Walker, var. *sanguinea* Williston.

Dixie Landing, Va. (near Washington, D. C.), May 25; one male. Length 14 mm. Frontal triangle yellow pilose, eyes black pilose. Third abdominal segment wholly black pilose; the fourth shining bluish black, and wholly orange pilose, except narrowly black pilose on hind border and continued on hypopygium. The brown spot of wings is streaked with hyaline.

31. **Volucella faciatis** Williston.

Fort Collins, Colorado (Gillette). One male I refer here. The pile of dorsum of thorax is black, but that of pleuræ, sides of thorax, and all of scutellum is yellow. The pile of abdomen also is wholly yellow, that of third segment having a tinge of reddish. The third segment bears a pair of large, quite distinct yellowish brown spots, concolorous with posterior margin of second segment; extra hyaline portions of wing brownish yellow, darker opposite termination of auxiliary vein; otherwise agrees with Williston's descriptions. Length 13 mm.

32. **Volucella fax** n. sp.

Length 11.5 mm.—Comes nearest to *V. avida* O. Sack. Differs as follows: Arista thickly plumose above, and a little on apex below; frontal triangle of male shining black, thinly black pilose; face straight below antennæ. Thorax shining black, lateral borders and scutellum pale honey-yellow; pile of thorax more yellowish, of scutellum more blackish; second abdominal segment with the black posterior margin narrow, but that of third segment very wide; narrow black hind border of second segment does not reach sides of abdomen, but becomes obsolete at outer fourth or fifth of width of segment. The yellow of second and

third segments is thus confluent on each side; the black of third segment is confluent with black of second, and is but slightly narrowed anteriorly; pile of yellow portions of second and third segments yellow, but black in a strip anterior to black borders of second to third segments; of black portions, black; fourth segment wholly greenish black with yellowish pile, fifth black. Venter yellow on each side basally. Legs blackish, basal half of all the tibiæ yellowish. Wings hyaline, with only a small brown spot at end of auxiliary vein; second vein irregular, *i. e.*, sinuous at its extremity. The antennæ are light brown, but blackish on upper edge.

Fort Collins, Colorado (Gillette). One male.

A male from Guanajuato, Mexico (A. Dugès), differs almost wholly in its smaller size, being only 9.5 mm. long. It is correspondingly narrower. The yellow abdominal markings do not differ to any appreciable extent. I cannot help believing, however, that it is a different species, but I prefer not to describe it from a single specimen.

33. **Volucella fornax** Towns.

El Torte, Baja Cal. (Cal. Acad. Sci.). One male; for description see Proc. Cal. Acad. Sci., 1894.

34. **Volucella hæagii** Jaenn.

Guanajuato, Mex. (A. Dugès). One male. Length 12 mm.; length of proboscis 5 mm.; first antennal joint brown, second and third light reddish brown; ten marginal macrochætæ on scutellum; first three tarsal joints light brown. Otherwise agrees with Osten Sacken's description, as modified by Williston.

Jamaica (Bowrey). One male. Length 13 mm. The shadowy black borders of second and third abdominal segments, due to the short black hairs, are much narrower than in the Mexican specimen, that of second segment being a mere line; stigma not so distinct, probably due to age of specimen. Scutellum shows by scars to have had ten marginal macrochætæ. Proboscis only 4 mm. long; a better preserved female specimen in Mr. C. B. Taylor's coll. was taken in Kingston, March 10.

35. **Volucella inops** n. sp.

Differs frem *V. fax*, ♂, as follows: A narrow line of yellow on cheeks; front wide, vertex and antennal protuberance shining black, intermediate portion yellow; pleuræ, thorax and scutellum with yellowish pile. Thorax shining black, lateral borders, scutellum and two slightly elongate, longitudinal, prescutellar spots, light yellow; yellow of second and third abdominal segments confluent; median prolongation of black of third segment not wide, narrowed anteriorly, but confluent with black of second. Black of second segment consisting of same narrow, laterally obsolete, posterior border, the median anterior prolongation of it narrow and equal in width throughout, only a little and equally

expanded before and behind. Therefore, the second segment is yellow, except this black inverted T-marking; fourth segment greenish black, with yellowish pubescence, fifth black; pile of black portions of second segment black, also of yellow portion for a space in front of the black on each side; of rest of yellow portion yellow; pile of yellow portions of third segment almost wholly yellow; of black portions black, except laterally, where it is also yellow. Venter of second segment almost wholly light yellow, rufous on the median line connecting with the rufous, which occupies all of third segment. Legs same, but middle tibiæ more yellow, and for more than basal half, and basal joints of tarsi reddish brown. Wings same; second vein irregular, *i. e.*, sinuous. Length hardly 10 mm., not including antennæ.

Fort Collins, Colorado (Gillette). One female.

This species may be differentiated at once from *V. satur* O. S., which it approaches, by the presence of the median black stripe of face and the wholly dark fourth abdominal segment. The arista in both this species and *V. fax* is long and thickly plumose above, exceeding in length the elongate third antennal joint.

36. **Volucella isabellina** Williston.

Las Cruces, N. Mex., July 12. One female, agreeing well with descriptions. The abdomen is reddish discolored, instead of pale yellowish.

37. **Volucella lucana** Towns.

El Torte, Baja Cal. (Cal. Acad. Sci.). One female; for description see Proc. Cal. Acad. Sci., 1894.

38. **Volucella mellea** Jaenn.

Guanajuato, Mex. (A. Dugès). Two specimens, ♂ ♀. These specimens agree very closely with Jaennicke's description, except as follows: The pile of eyes has a blackish vertical streak in the middle. There is no sign whatever of the three vittæ on thoracic dorsum, which is uniformly shining dark greenish; first abdominal segment does not seem to be entirely black in male, and is mostly honey-yellow in female; peculiar spots on third and fourth segments in both specimens, better shown on fourth. Wings with clouds on the anterior cross-vein, termination of auxiliary, origin of third vein, tip of second vein, two cross-veins at distal end of second basal cell, and terminal portions of last two sections of fourth vein. Of the most pronounced clouds in the female are those on the anterior cross-vein and at tip of second vein. All three costal cells yellowish. The female has a stump of vein on inside of next to last section of fourth vein, but there is no sign of such in the male.

39. **Volucella obesa** Fabr.

Jamaica (Bowrey, Ckll.). Found at Kingston. Sixteen specimens, seven males and nine females. Length very constant, 10–11 mm. Antennæ vary from light brown to dark brown; arista is not black at tip, and I would not say it was "thickly plumose" for a *Volucella*. Front of female shining green, narrowed posteriorly. Eyes very short pilose; hind metatarsi same in both sexes, thickened, and as long as remaining joints together. Wings flavous on anterior portions rather than brownish; the two clouded spots are very distinct and dark brown in nine of the specimens, but faded in the other seven, in five or six being flavous.

Recorded from Jamaica by J. J. Bowrey (article on insects, Handbook of Jamaica, for 1881, p. 120). Specimens in coll. C. B. Taylor.

40. **Volucella pallens** Wd.

Bath, Jamaica. One male in Mr. C. B. Taylor's coll. Differs from Williston's description of *V. sexpunctata* Lw. as follows: Dorsum of thorax blackish with yellowish pubescence, the sides and prescutellar parallelogram yellowish like the scutellum. Third segment without a blackish spot in middle. Recorded in MSS. by C. W. Johnson from Port Antonio; one specimen.

41. **Volucella satur** O. Sack.

Fort Collins, Colorado (Gillette). One male. It agrees in all particulars with Williston's description, except that the yellow portion of fourth segment has a decided reddish brown tinge; tarsi light reddish, all except the tips.

42. **Volucella sodomis** Towns.

El Torte, Baja Cal. (Cal. Acad. Sci.). Two males; for description see Proc. Cal. Acad. Sci., 1894.

43. **Volucella toltec** n. sp.

A male from Guanajuato, Mex. (A. Dugès), differs appreciably from *V. inops*. The differences are as follows: Length 9.5 mm.; eyes contiguous, frontal triangle only black at base of antennæ; fourth abdominal segment narrowly yellowish on anterior border; black border of second segment more prolonged laterally, not reaching the edge of abdomen however. Scutellum with a blackish reflection basally in oblique lights. Wings slightly flavous antero-basally,

with four brown clouds: on small cross-vein, at origin of third vein, at termination of auxiliary vein, and on cross-veins at distal end of second basal cell.

In *V. inops* ♀ only the stigma is brown, the cross-veins being hardly perceptibly clouded.

44. **Volucella vacua** Fab., Wied., Auss. Zweif. ii, 202–203.

Length 7 mm.—Antennæ pale yellowish brown; median stripe of face and front brown. Cheeks with a dark brown shining stripe, wider above; the yellowish prescutellar marking notched anteriorly; the two yellow spots of pleuræ are callosities, the posterior one bearing yellowish pile. Pile of thoracic dorsum yellowish, that of scutellum blackish. Scutellum straw-yellowish. The black of hind margin of second abdominal segment is prolonged anteriorly in a median line half way or quite to base of segment; that of third segment is prolonged anteriorly in the form of a median pair of lines reaching base of segment; that of fourth is more or less obscure, prolonged into a median spot at base of segment, in one specimen only is the spot apparent, the segment being otherwise yellowish. Pile of black portions of abdomen blackish, of rest light yellowish, all very short, that of fourth segment much longer and yellowish. The femora, and the tibiæ on basal two-thirds, yellowish. Wings sub-hyaline, with yellowish brown or brownish clouds; one extending from origin of third vein inward along the two cross-veins at distal end of second basal cell; a wider one extending from tip of auxiliary vein inward to third vein at a point posterior to the small cross-vein, and barely, or not, connected with one on the latter; and, finally, a system of more or less connected clouds occupies the apical one-third of the wing, only following the veins distally, and terminating inwardly on the fourth vein; hyaline portion of middle of wings with a whitish shade. Otherwise the specimens agree well with Wiedemann's description.

Jamaica (Bowrey). Two females.

This species was recorded from Jamaica by J. J. Bowrey, in article on "Insects," in Handbook of Jamaica, for 1881, p. 120 (Kingston, 1881). His specimens were determined at the British Museum.

Two specimens, Kingston, coll. C. B. Taylor.

45. **Sericomyia militaris** Walk.

Fort Collins, Colorado (Gillette). One male. The whitish pile of face is very scanty; the scutellum is concolorous with thorax, with same pale bluish reflection. No yellow dots on second abdominal segment. The pile of abdomen is wholly yellow, as described by Williston for the females, only a band of black pile on posterior portion of second segment. The fourth segment has a fringe of yellowish silvery pile on hind margin exactly like that of third segment. In all other respects it agrees with Williston's description; hind coxæ with tubercle. Length slightly over 14 mm.

46. **Arctophila flagrans** O.-Sack.

Fort Collins, Colorado (Gillette). One female, which measures only 9 mm., I refer to this species. Only the male has been described; although the anterior cross-vein is situated well before the middle of the discal cell, and there is such a difference in size, still I am confident that the specimen must be referred here. The more robust form and pilosity indicate its affinities with the groups having the anterior cross-vein beyond or near the middle of the discal cell.

It differs from Osten Sacken's description as follows: Female.—Length 9 mm.; third antennal joint more yellowish, the two basal joints nearly black; ground color of thoracic dorsum and scutellum, seen through the yellowish pile, is metallic dark greenish, or greenish black. The middle tarsi are quite uniformly blackish, not reddish basally, like the hind tarsi. In all other respects it agrees closely with the description.

47. **Eristalis æneus** Fabr.

Washington, D. C. Three males taken May 2, August and November 28. Dixie Landing, Va., one female, July 13; agrees well with descriptions.

48. **Eristalis** n. sp. (?) aff. *atrimanus* Loew (non Williston).

Bath, Jamaica (E. M. Swainson). One female I doubtfully identify as Loew's species; and I feel assured that the species from Santo Domingo described by Williston in his monograph (pp. 173–174) is not *atrimanus* Lw., but a new species, for which I propose the name *williston*i.

The present specimen from Jamaica agrees well with Loew's description in all except one particular; the anterior lateral spots of third abdominal segment are not æneous, but yellow like the lateral portions of second segment. The interrupted, shining, æneous fascia of fourth segment, when viewed in certain lights, shows its true ground color to be yellow; and it should also be noted that the yellow of second segment is shining on anterior median margin. Whether the markings of third segment vary in *atrimanus* ♀ from shining æneous to more yellow cannot be known until more material is obtained, and this only will decide the position of the present specimen. The latter is just the size of Loew's specimen, about 9½ mm., and possesses the oblique yellowish markings at base of wings described by Loew as connected with the pre-sutural band. Williston's specimens lack these, and are much larger, being 12 mm.

In my specimen the antennæ are, however, rather yellowish brown than black, and the wings are clear hyaline. The yellow markings of third segment are sub-semicirenlar and separated, touching the front margin; and the shining, interrupted band of fourth is not widened laterally.

49. **Eristalis bastardi** Mcq.

Washington, D. C., May 27. One male. Face and frontal triangle light yellowish pollinose. No black pile on thorax; reddish yellow markings of third segment distinct, and similar smaller markings distinct on anterior angles of fourth segment.

50. **Eristalis bronsi** Williston.

Hanover, N. H. (Weed). Six males and three females. Fort Collins, Colorado (Gillette), one male. The males all agree very well with the descriptions. The Colorado specimen has the yellow of abdomen a little lighter. In the females the opaque black of second segment widens out along the hind margin; and the third and fourth segments have an opaque black posterior border, connected on third with the median anterior opaque spot by an opaque line. The front is brassy pollinose, rather than reddish. Length 8–10 mm.

Another female, from Orono, Me. (Harvey), has third segment with the small opaque spot in front, fourth without; second, third and fourth rather widely whitish pollinose on hind border, the narrower margin yellowish white.

51. **Eristalis dimidiatus** Wied.

Washington, D. C., May 17–22. Two males, and one female; first two antennal joints shining brownish in the one ♀. The front of female has no median brown stripe, only a faint streak abbreviated below. All my specimens have the yellowish spots on second segment distinct; in one male those on the third segment also.

52. **Eristalis flavipes** var. *melanostomus* Loew.

Fort Collins, Colorado (Gillette). One female; on each side of middle of second abdominal segment the ground color is yellowish, anterior to which the pile is yellowish. On third segment the same spots occnr, but are very faint and more reddish, and on and posterior to them the pile is yellow, continued broadly on sides of fourth segment; middle tibiæ yellowish on basal half, the yellow hairs with a few black on distal portions; a faint brown cloud extends from stigma to anterior and posterior cross-veins.

53. **Eristalis hirtus** Loew.

San Francisco Mt., Arizona, July 15. One male and two females (two coll. by Cordley); also one male, Manitou, Colo. (F. Marlatt), September 1. These specimens all show the light yellow triangles of the second segment very plainly. The face in the females is more yellowish, especially the pile of face and front; the hind femora of female are yellow at base. All have the whitish yellow hind margins of second to fourth segments distinct.

54. **Eristalis latifrons** Loew.

Las Cruces, N. Mex., two females, April 8 and 9; three males April 8, and one male June 5. One female, La Vega de San Josè, N. Mex., August 4; one male, Turkey Tanks, Arizona, July 17; also one male, apparently this species, from San Francisco County, Cal. (Acad. Sci.). The scutellum is translucent brownish yellow. Otherwise these agree well with Williston's description.

Var.—I have ten female specimens from Las Cruces, N. Mex., taken April 8 to June 28, and one female from Riley County, Kans. (F. Marlatt), September, which constitute a distinct series that I cannot refer to any other species. They differ from the others in having a faint but distinct brown cloud on middle of wings, the anterior base of wings being more or less flavous, and in having the yellow spots of second segment wholly obsolete or very obscure yellowish brown. One specimen in this series shows the spots pale yellowish, especially laterally, while one female (Vega de San Josè), that I included in the normal series, has the wings with a distinct brownish flavous cloud.

55. **Eristalis tenax** Linn.

Washington, D. C., numerous specimens, May. Guanajuato, Mex. (A. Dugés), one male; California, three specimens (Cal. Acad. Sci.).

The scutellum, which is yellowish and yellowish pilose, is omitted from Williston's description.

In all my collecting in the valley of the Rio Grande in southern New Mexico, I did not find this cosmopolitan species (up to June, 1893). It is also apparently absent from the island of Jamaica.

56. **Eristalis transversus** Wied.

Constantine, Mich., three males and two females, August 24–31. Dixie Landing and Roslyn, Va., two females and one male, August

18–21. Washington, D. C., one female and one male, May 5 and 19. Takoma, D. C., one female, September 7. These all agree well with Williston's descriptions.

57. **Eristalis tricolor** Jaenn.

Guanajuato, Mex. (A. Dugès). One female; tibiæ yellow basally.

58. **Eristalis vinetorum** F.

Bath, Jamaica (Swainson). One female measuring 13 mm., and one male measuring 9 mm. The median facial stripe in both specimens shows only as two disconnected markings; a section on facial tubercle elongate-pointed above, and a median spot on oral margin. These with the cheeks and a subtriangular marking at posterior base of antennæ, are shining pale metallic brownish. All the rest of face and frontal triangle in male is whitish pollinose and whitish pilose. Otherwise Williston's description agrees well, except that the female has the wings quite flavous on middle portion. The distal portion of first posterior cell contains a grayish cloud, as well as the marginal and submarginal cells. The hind tibiæ of both are distinctly ciliate. The prescutellar fascia is semicircular and almost, or quite, joins ends with the presutural, following the edge of the thorax around.

Mr. C. W. Johnson, in litt., determines this species from Port Antonio. This species was previously recorded from Jamaica by Walker under the synonym of *avarum*. Specimens in C. B. Taylor's coll., Jamaica.

Trinidad (F. W. Ulrich). One female. The yellow of second abdominal segment is more extensive than in the Jamaican specimens.

59. **Eristalis** sp. No. 21, Williston, Biol. Cent.-Amer., Dipt. iii, p. 65.

Chacaltianguis, on the Papaloapam River, State of Vera Cruz, Mexico. One male taken by the writer in sweeping, Dec. 31, 1892. With little doubt this species. The antennæ are more brownish red. Abdomen is rather reddish yellow, and the black of second segment is expanded on base of abdomen into a bar forming a T-shaped marking. Agrees exactly otherwise with Williston's short description.

60. **Meromacrus cinctus** Drury.

Jamaica (Bowrey). Four (two ♂, two ♀) from Cinchona, 5000 feet (W. Fawcett). Eleven specimens, four males and seven females. Length 15–17 mm. Scutellum wholly yellowish brown, without any red tinge, but with slight blackish reflections in oblique lights. The

abdomen in my specimens is brownish red, third to fifth segments in male deeper reddish brown and shining, fourth and fifth segments and posterior margin of third in female shining deep green. One male from Cinchona has the fourth segment with a metallic bluish reflection. First and second segments quite uniformly opaque brownish red, only faintly lighter on each side of middle. The cross-band of anterior margin of third segment is very finely interrupted in middle, showing only a very delicate thread of red, in one female hardly apparent, but emarginate behind. This band in the male widens laterally, not so in the female. Lateral spot of yellow pile of fourth segment a little larger in the male. Front femora of male not thickly black pilose on posterior side like the middle pair. Wings are smoky hyaline, slightly flavous on anterior border, more deeply and widely so toward base of wing, distally filling only the fourth costal cell; spurious vein on its middle appearing enlarged, as though fractured, with a slight cloud. Otherwise agreeing with Williston's description of his Santo Domingo specimens.

A character of the wings in this genus, which seems to have been overlooked, is the presence of an extra cross-vein, forming a fourth costal cell. It is not mentioned by Macquart, Loew, or Williston. This extra cross-vein takes the place of the stigma, which is entirely absent, and joins the auxiliary vein a little before its tip with the first vein. The original third costal cell is thus formed into two cells. This is plainly shown in all of my specimens, as is also the peculiar swollen and clouded middle of the spurious vein.

There is an approach to this extra cross-vein in some specimens of *Eristalis*, the proximal portion of the stigma in the right wing of a specimen of *E. flavipes* var. *melanostomus* from Colorado almost appearing like a cross-vein. It seems apparent also in an unspurred male of *Mallota cimbiciformis*, from Washington, D. C. Williston figures the wing of *Pter. crucigera* in his monograph, but the figure indicates rather a small stigma than a cross-vein.

Mr. Coekerell has mentioned this species on p. 74 of Jour. Inst. of Jamaica as sent from Bath (Swainson).

Note.—The same swollen middle of the spurious vein is to be seen in many other Syrphidæ, as *Spilomyia*, etc.

The genus *Pteroptila* Lw. is a synonym of *Meromacrus* Rdi. (see Williston, "Ent. News," April, 1893).

61. **Helophilus aurcopilis** n. sp. aff. *flavifacies* Bigot.

Length 10 mm.—Face, cheeks and lower half of front wholly light yellow and

yellow pilose. Antennæ wholly yellow, with an orange tinge, the arista darker terminally. Upper part of front darker, black pilose, vertex yellow pilose. Thorax yellowish pilose, with three broad blackish vittæ reaching scutellum, leaving four yellowish vittæ. Scutellum yellowish; pile of thorax and scutellum yellow, of pleuræ thickly yellow; that of abdomen short and chiefly yellow. First abdominal segment gray pollinose, except on posterior angles; yellow spots of second segment very distinctly interrupted; of third almost joined by two yellow triangular elongate spots; fourth with yellowish pollinose separated spots shaped like those of second, fifth yellow pollinose. Black of second segment expanded broadly on each side anteriorly, running on to sides of first segment. Second segment with a very narrow yellow hind margin; third with a broader yellow margin, somewhat pollinose anteriorly in middle; fourth with a yellow margin of same width and a grayish pollinose band next in front of it. Legs yellow; middle and front femora at base, hind femora in middle, hind tibiæ at tip, and hind tarsi except tip, blackish; hind tibiæ near base, and hind knees, brownish; also front tibiæ narrowly on inside at tip. Wings fuscous-hyaline, dilute flavous on more than basal half.

Constantine, Mich., August 26. One male; agrees well with Bigot's description, but as the latter is not detailed the identity cannot be certain.

62. **Helophilus latifrons** Loew.

Las Cruces, N. Mex. One female, June 8. Length 12 mm. Agrees well with Williston's description; antennæ black, arista yellow.

63. **Helophilus similis** Mcq.

Constantine, Mich. One male and one female, August 28 and 31. Length 12–13 mm. Agree well with the distinctive characters pointed out by Williston wherein the species differs from *latifrons*.

64. **Mallota cimbiciformis** Fall.

Washington, D. C. (Marlatt), May 17. One male. Length only 10.5 mm. Belonging to the form *cimbiciformis*, unspurred; pile of frontal triangle and face yellowish white, sparse; brown spot of wings faint; pile of front and middle legs more or less yellowish; pile of abdomen all black, except at base.

65. **Tropidia incana** n. sp.

Length about 7 mm. Differs from female of *T. quadrata* as follows: Face and cheeks entirely shining black, somewhat silvery pollinose. Face distinctly concave in profile. Antennæ dark reddish or reddish brown. No median pollinose stripes apparent on thoracic dorsum; whole thoracic dorsum and scutellum shining black, the latter without any yellow on the border; pleuræ also shining black. Abdomen pale red, first segment black, except hind angles; second segment with a median black vitta, which is expanded anteriorly, coalescing with the black of first segment; posteriorly it is also widened about half way to lateral edge on

each side; third segment with a similar vitta, but not at all widened anteriorly, truncate instead, posteriorly widened in a similar manner to that on second segment, but less so; fourth segment with a black subtriangular marking, truncate anteriorly; posterior borders of second and third segments reddish, very narrowly yellowish on the edge, that of fourth segment more yellowish; venter red, blackish at base in middle. Legs black, knees of anterior and middle pairs yellowish. Wings subfuscous, nearly hyaline, stigma flavous. The first posterior cell is more broadened and shortened, the last section of fourth vein bulging out more.

Fort Collins, Colorado (Gillette). One female.

It may at once be known from *T. quadrata* by its red abdomen and shining black face, combined with the absence of a yellow border on the scutellum.

66. **Tropidia quadrata** Say.

Washington, D. C., May 19. One male. The posterior band of second segment is wholly reddish yellow, brownish at lateral ends; rest of light color of segment yellow, leaving only an opaque black T, which is not inverted, and the bar of which extends on hind border of first segment. Third segment with the opaque, black, median vitta abbreviated on more than its posterior half, lapsing into reddish yellow, which spreads along hind margin of segment.

67. **Xylota chalybea** Wied.

Washington, D. C., May 22. One male. Length 14 mm. Dorsum of thorax and scutellum with a strong violet shade.

68. **Xylota flavitibia** Bigot.

Fort Collins, Colorado (Gillette). One male; pleuræ and scutellum with longer whitish pile than dorsum of thorax, which is thinly pilose. First abdominal segment wholly black, apparently without red hind angles; but the anterior angles of the red second segment appear to be very acute and to fill the place of the hind angles of the first, which seem cut off or rounded. The brownish of front and middle tibiæ is not very noticeable. Wings hyaline, only the stigma pale yellowish.

69. **Xylota pigra** Fab.

Washington, D. C., May 22. One female; scutellum concolorous with thoracic dorsum. Black of second segment faintly apparent in a median vitta on third, and even on base of fourth; ovipositor exserted, very long, curved under abdomen, pale brownish, not orange like the fifth segment, from which it is protruded; fifth segment subtriangular, very narrow behind; ovipositor consisting apparently of three segments.

70. **Syritta pipiens** Linn.

Constantine, Mich., ♂ ♀. Hanover, N. H. (Weed), one female, Riley County, Kansas (F. Marlatt), ♂ ♀. Mountain View, Cal. (Ehrhorn), May to October, ♂ ♀. Las Cruces, N. Mex., one female, June 7.

This species does not seem to spread into the tropical regions of America.

71. **Spilomyia longicornis** Loew.

Constantine, Mich., August 31 to September 1, three females and two males. Dixie Landing, Va. (near Washington, D. C.), October 5, one male. Length 12–15 mm. They all agree very well with the description; the hypopygium is brown, almost shining black in the Virginia specimen. The latter also has more brown on posterior side of hind femora.

In one female the yellow bands of abdomen, except the anterior fascia of second segment, is faded into a brownish color.

72. **Spilomyia quadrifasciata** Say.

Constantine, Mich., August 21 to 31, one male and four females. Length 11–14 mm. Frontal triangle in the one male pale brownish next base of antennæ.

73. **Milesia ornata** Fab.

Washington, D. C., August 4. One male; a normal specimen.

74. **Ceria abbreviata** Loew.

Fort Collins, Colorado (Gillette). One female; the third antennal joint is light reddish brown, the tip of second joint being concolorous with it. The scutellum is widely (about two-thirds its width antero-posteriorly), bordered with yellow. The posterior yellow border of second abdominal segment is distinctly, but not greatly wider than those of third and fourth segments. Legs pale reddish, bases of hind tibiæ broadly yellow, of middle and front tibiæ more narrowly so; possesses all the other characters in detail given in Williston's description.

75. **Ceria tridens** Loew.

Las Cruces, N. Mex., April 8, one male; June 21, one female. Length 9–9.5 mm. Facial stripe brownish yellow in female; yellow extending wholly across frontal triangle, with only a thread of light brown; yellow oval spots of vertex narrowly separated in female by

a brown line, in male merged in a single, light yellow, swollen marking. The small yellow spot on the pteropleuræ is very faint in the female, wholly absent in the male; scutellum almost wholly yellow in both; yellow bands of second and third segments hardly widened laterally; grayish pollinose lateral lunate markings of fourth segment plain in female, only the ends apparent in the male; hind femora of male colored like the others, brownish ring of tibiæ very faint. Legs of female entirely ochraceous, bases of tibiæ yellow, hind tarsi brownish, otherwise the specimens agree with Williston's descriptions of the two sexes.

These two specimens I believe to belong to the same species, and are doubtless *tridens* Lw., notwithstanding the above differences. The second and third abdominal segments are of nearly equal length in both.

CONTRIBUTIONS TO THE DIPTEROLOGY OF NORTH AMERICA.

II.—TABANIDÆ, CONOPIDÆ, TACHINIDÆ, Etc.

BY C. H. TYLER TOWNSEND.

This paper is a continuation of the work begun in the first part, which was on the Syrphidæ (Trans. Am. Ent. Soc. p. 33, 1895). The present and second part embraces the three families above mentioned, and completes the author's notes and descriptions so far made on the Townsend collection, which, as before stated, now forms a part of the University of Kansas collection of North American Diptera. Therefore all of the types herein described are to be found in that collection, with the exception of a very few recently acquired, and which are duly noted.

STRATIOMYIDÆ.

1. **Pachygaster pulcher** Lw.

Las Cruces, N. Mex. A female taken on foliage, May 5, proves to be this species. Unlike the two female specimens from Montana, mentioned by Williston in "Can. Ent." 1885, p. 128, it has the femora blackish, except at base and tip. The front and third coxæ are also black, except at tips. The short pubescence of mesoscutum

is brassy golden in color. There is some very indistinct white pubescence on pleuræ. The length is 2 mm. (abdomen is flexed under apically); length of wing 2.5 mm.

TABANIDÆ.

2. **Chrysops callidus** Osten Sacken.

Dixie Landing, Va., June 1 to July 6. Four females; ends of Λ-shaped marking on second segment prolonged laterally along the hind margin, in two specimens strongly and in the other two weakly; segments of venter toward tip brown, margined with yellowish. The cloud of fifth vein coalesces hardly, or not at all, with the cross-band.

3. **Chrysops costatus** Fab.

Kingston, Jamaica; recorded by F. Walker from Jamaica (List Diptera in British Museum, pt. v, 1854). Best description is given by Wiedemann (Auss. Zw., i, 198). One female September 11, from Dr. W. H. Stracham; and one female November 18, captured on Museum window.

What is usually supposed to be the first ring or section, of the third joint of the antennæ in *Chrysops* is, in this species, at least in the above two specimens, annulated or segmented with unusual distinctness, making the third antennal joint appear as if composed of eight annuli. The frontal callosity is of about the same rusty yellowish color of the face, but with the posterior edge brown. In both specimens also, the outer branch of the two blackish abdominal markings (of tergum) extends to (not on) the sixth segment, instead of only to the fifth as Wiedemann describes. The inner branch extends to (not on) the fourth segment. Thus the outer arm or branch of the markings extends the width of two segments farther posteriorly than the inner branch. The venter of abdomen has a lateral longitudinal blackish brown vitta, beginning about middle of second segment, continuing to posterior border of third, and more faintly on fourth and fifth segments.

The two basal cells, and also the anal, are hyaline, except a slight infuscation of former at proximal end, and of all at distal end. The discal cell and last posterior contain each a hyaline spot, that of the latter reaching the margin. First two joints of antennæ long and very nearly equal.

Dr. Williston has identified this species from Santo Domingo (Tr. Kan. Acad. Sci. x, 134). Macquart has recorded it from Cuba, and Fabricius and Wiedmann from South America. I am able to verify Walker's determination of it from Jamaica.

Mr. C. W. Johnson, in litt., determines it from Port Antonio, Jamaica.

4. **Chrysops montanus** O. S.

Pompanoosuc, Vt. (C. M. Weed). One female; first two antennal joints reddish yellow; third yellowish brown, the last four annuli black. Thorax brownish, with two broad, median, grayish stripes, and lateral more yellowish ones. The median pair of longitudinal blackish markings on abdominal segments three and four coalesce anteriorly, but not so broadly as those of second segment; none of the spots of one segment coalesce with those of any other segment. Front femora blackish at base; the middle knees, unlike the others, not blackish. The cloud on fifth vein does not join the cross-band of wings; otherwise agrees well with Osten Sacken's description.

5. **Chrysops niger** Macq.

Dixie Landing, Va., May 25 to June 22. Three females. In all three of the specimens the first basal cell is lighter than rest of clouded portion, in fact it is largely subhyaline. In all other respects they agree closely with Osten Sacken's description. Fourth posterior cell hyaline next the intercalary vein in all.

6. **Chrysops vittatus** Wied.

Riley County, Kansas (F. Marlatt), August; two females. Length 7.5 mm. Frontal callosity yellowish, like the face; no "vestiges of yellow spots" on sixth segment. In one specimen the venter has a median blackish spot on third, fourth and fifth segments, in addition to the lateral stripes; otherwise they agree well with Osten Sacken's description.

7. **Silvius quadrivittatus** Say.

Smithville, So. Dakota (J. M. Aldrich); four females. These do not differ from southern New Mexico specimens, except that they seem to be a little more yellowish pollinose, and average somewhat larger. A single female from Riley County, Kansas (F. Marlatt, June), is also larger.

8. **Therioplectes astutus** Osten Sacken (?)

Orono, Me. (Harvey); one female. Differs from description as

follows: Palpi hardly thickened at base, pale brownish yellow; third antennal joint considerably excised, with a very distinct angle, segments of annulate portion not distinct. Thorax with five narrow gray vittæ; otherwise agrees well, but the eyes are nearly bare, and very indistinctly, if at all, pubescent.

9. **Therioplectes comastes** Will.

Custer County, Colorado (T. D. A. Cockerell). Three females I refer to this species on account of the reddish first, second and base of the third antennal joints, and the absence of any cloud on furcation of third vein. *T. phænops* O. S. differs only in the black antennæ.

Placer and Santa Clara Counties, California (E. M. Ehrhorn). Two females. Length 13 mm., I am inclined to refer to this species. They differ as follows from Williston's description: Face is white with white pile, that on upper border near eyes narrowly blackish; palpi pale yellowish, or rather whitish, with sparse black hairs and white pile; basal joints of antennæ pale reddish; front is but slightly convergent anteriorly; first to fourth abdominal segments with an oblique area of whitish hair on sides, all segments thinly bordered behind with whitish hair, and abdomen with whitish hair on sides.

10. **Therioplectes zonalis** Kirby.

Orono, Me. (Harvey); two females. Length 16.5 and 18 mm. The smaller female has yellowish hair on cheeks, and the yellow borders of abdominal segments very narrow; but the light reddish antealar tubercle, brownish palpi, and narrow front indicate *zonalis*. The hair of abdomen, also, except on hind borders of segments, is black. The other specimen is more normal, but the yellowish borders of the abdominal segments bear black hairs among the yellow, becoming almost exclusively black on the last two or three segments.

11. **Atylotus baal** n. sp.

Length 14 mm.—Front moderately broad, black; frontal callosity square, shining, with a prolongation, above which is widened on terminal half or more. Face blackish, cheeks with whitish hair. Antennæ pale yellowish, with a brownish tinge, annulate portion of third joint shining black; third antennal joint very slightly excised above; palpi whitish, with black hairs; pleuræ and pectus blackish, with whitish hair. Thorax brown, with short yellowish hairs, scutellum concolorous. Abdomen pale yellowish brown, with a yellowish, more or less interrupted median streak, some short whitish hair on middle of first segment and on outer posterior margins of other segments (perhaps also along median vitta, but if so, rubbed off), rest of abdomen with short black hairs. Venter more yel-

lowish. Legs yellowish, the terminal half of tarsi, and front and middle trochanters blackish, the middle and hind femora tinged with brownish. Wings clear, costal cells very dilute yellowish.

Dixie Landing, Va., June 22. One female.

12. **Tabanus alene** n. sp.

Length 10 mm.—Rather nearly allied to *T. parvulus* Willist. from Santo Domingo. Front of moderate width, quite parallel. Antennæ reddish yellow, the annulate portion and angle of third joint black, with a slight tinge of black on other joints distally; frontal callosity nearly square, pointed above, convex below. Rest of front yellowish gray pollinose, with a brownish shade on vertex, and another between latter and callosity; subcallus not denuded, yellowish gray pollinose; third antennal joint not wide at base, very narrow, but with a distinct angle. Face with a white bloom and white pile; palpi pale yellowish tawny; pleuræ and sternum with whitish pile. Dorsum of thorax light brown, with five yellowish gray vittæ, the sides and posterior border lighter. Scutellum of same brown, with a lighter border. Abdomen pale yellowish brown, the last three segments darker; all the segments with a narrow grayish hind margin, which is dilated into a small median triangle on second to fourth. All the segments with a vestige of a whitish pollinose spot on each side, each separate and not touching borders of segment. Legs pale brownish yellowish, tarsi darker. Wings hyaline; the stigma, furcation of third vein, small cross-vein and origin of third, and cross-veins at distal end of second basal and discal cells, narrowly clouded; costal cells quite clear, except at stigma.

Bath, Jamaica (Mrs. E. M. Swainson); one female. Type in coll. Townsend.

13. **Tabanus angustifrons** n. sp.

Length 9–11 mm.—Pale yellowish brown; no limpid spots on wings, which show no marked cloudiness, but are only yellowish on costal portion; first two antennal joints reddish yellow, the third wholly black. Abdomen yellowish brown, with hind margins of segments pale yellowish gray, enlarging into a triangle in the middle and forming an approach to a median line; front is very narrow and parallel, eyes bare. Basal enlarged section of third antennal joint distinctly angular above; palpi tawny grayish. Legs brownish, bases of tibiæ and tarsi lighter.

Jamaica. Two female specimens. One from Cinchona (5000 feet), Jamaica, August, 1893, W. Fawcett. A small species.

This is not *T. lucidulus* Wlk., as it has no limpid spots on wings. I doubt that it is *T. rufiventris* Macq., as identified by Walker, which was from Cuba. At any rate Macquart's description is too meagre to be certain. It is none of the Santo Domingo or other new species described by Williston (in "Trans. Kans. Acad. Sci." x). Macquart described *rufiventris* from a male specimen, which makes the determination of that species at the best very uncertain, and doubtless Walker's determination of it from Jamaica is wide of the mark. *T. rufiventris* should, therefore, be dropped from the Jamaican list of Diptera until competently identified.

14. **Tabanus atratus** F.

Constantine, Mich., August 26; one male. Washington, D. C., May to September, one female and two males. One of the males has the first posterior cell closed, and another has it nearly closed. None have yellowish hind margins to wings.

15. **Tabanus exul** O. S.

Dixie Landing, Va., four females, July 6–13; Washington, D. C., two females and one male, June 30 to August 4. These specimens all agree well in coloring with Osten Sacken's description, in Part II of Prodrome, of the original *T. abdominalis* with the first posterior cell closed. The male and three of the females have the first posterior cell well open, but moderately coarctate; two other females have it narrowly open and strongly coarctate; while the remaining female has it very narrowly open, almost closed, in the left wing; but like the preceding in the right wing. These specimens, agreeing so closely otherwise and showing such variation in the first posterior cell, seem to indicate that the latter character is of little importance even in separating varieties. There seems to be no difference among the female specimens in the width of the front, which is moderately wide. Length 19–22 mm.

It is interesting to note that the females of this species are very numerous in July on the small steam tug-boats that run on the Potomac from Washington up to Dixie Landing. They alight on all parts of the boat while in mid-river.

16. **Tabanus exul** var. or n. sp.

Riley County, Kansas (F. Marlatt, June. One female, 18 mm. long, differs in having a narrower front, the first posterior cell wide open, the third antennal joint black except extreme base, form not so stout and thorax appearing narrower, abdomen and legs brick-brown, and median triangles very faint, with grayish instead of yellowish hairs among the black hairs on abdomen. The hind tibiæ are less noticeably sub-ciliate, the yellowish gray pile of underside of head and thorax less plain, frontal callosity oval and pointed above, where it sends out the spindle-shaped prolongation. This seems to be a distinct species.

17. **Tabanus punctifer** O. Sack.

Fort Selden, Dona Ana County, N. Mex.; one female, June 13. La Vega de San Josè, Valencia County, New Mexico; two females, August 4. Chaves, N. Mex.; one male, August 6. One female (August 4) is without the clouded spot at base of second posterior cell.

LEPTIDÆ.

18. **Arthropeas** n. sp. ?

Hill City, So. Dakota (Titus Ulke); one female specimen. Length 15 mm.

It differs from Loew's description of the same sex of *A. americana* in its larger size, in having the front entirely black, and in the wings being fulvescent without black design, except subfuscous clouds along the veins.

In the left wing of this specimen there is a well formed extra cross-vein behind the discal cell, exactly opposite to the small cross-vein and of almost the same length. It cuts off the inner corner of the fourth posterior cell where it joins the second basal, thus making the fourth posterior cell five-sided and forming a small triangular sixth posterior cell immediately at the extremity of the second basal.

CONOPIDÆ.

19. **Conops brachyrhynchus** Mcq.

Las Cruces, N. Mex., June 18–25; two males and one female. Length 7⅝–9 mm. These agree very well with Williston's description of *obscuripennis*, which is a synonym (acc. to Willist.). In addition to the golden yellow markings of the thorax mentioned by Williston, there is an indistinct prescutellar band of that color which, however, is obsolete in one male specimen. The whole of fifth and sixth segments is brassy yellow dusted, and sometimes even the fourth appears wholly so in certain lights. The yellow on tip of second and beginning of third segments is more or less silvery white pollinose.

20. **Conops fronto** Willist.

Las Cruces, N. Mex., June 8 and 25; one male and one female. Length 8.5–10 mm.; silvery lustre distinctly defined on sides of face; disc of first, third, fourth and fifth abdominal segments more or less black; the black of fourth, and of fifth especially, being an anterior border; otherwise agrees perfectly with Williston's description.

21. **Conops gracilis** Will.

Las Cruces, N. Mex., June 15–28; three females and five females. Length 9–11 mm. Two of the females and four of the males have the front pure yellow, with hardly a trace of the brown in the middle. The vertex is yellow in most of the specimens; facial grooves are brownish in middle at the furcation in one male and one female. The males have none, or more or less, blackish on first, fourth and

fifth abdominal segments; the females have it pronounced on these segments, and also on third segment in two specimens. In all other respects these specimens agree closely with Williston's description.

22. **Conops xanthopareus** Will.

Riley County, Kansas (F. Marlatt), August and September; two males. Length 10–11 mm. Agrees well with Williston's description; costal cells dilute yellowish. The subhyaline in discal cell appears rather to form, with that of first basal, a single rather clear stripe.

23. **Physo cephala affinis** Will.

Constantine, Mich., September 6; one female. Length nearly 13 mm. Vertex pale reddish. The median λ-shaped line of front more blackish; facial grooves smoky brownish in middle of each; humeral pollinose spots golden-yellow; coxæ silvery. First posterior cell with a rather small median hyaline spot on inner edge; four costal cells yellowish hyaline.

There is but little difference between this species and *castanoptera* besides the hyaline outer portion of discal cell and the hardly less hyaline outer portion of submarginal.

24. **Physo cephala castanoptera** Lw., Neue Beiträge, i, 33.

Constantine, Mich., August 31; one male. This is a valid species, distinct from *sagittaria* Say. It will be distinguished from the latter by the yellowish vertical callosity; the red lateral and hind margins of thoracic dorsum; the red pleuræ, scutellum, prescutellar marking, and upper border of metanotum; and by the costal cells being distinctly clear or slightly yellowish. The red prescutellar marking is a parallelogram joining the red border of the thorax. Coxæ brown, silvery pollinose outwardly; legs red, tarsi brownish on terminal joints, basal half of tibiæ more yellowish. Second abdominal segment red, except a blackish patch on disc; first segment reddish, brownish on disc; third segment red anteriorly. Metanotum black, except the red upper border.

Las Cruces, N. Mex., June 4 and 26; one male and one female. These differ from the Michigan specimen in having abdominal segments 4–6 more golden pollinose, and the vertical callosity is slightly tinged with reddish.

25. **Physo cephala ochreiceps** Big.; Will., Biol. C.-Am., Dipt. iii, 83–4.

Las Cruces, N. Mex., June 28; one female. Differs from Williston's description of *P. texana* as follows: Length 10.5 mm.; third

antennal joint a little longer than first, and about one-half as long as second; disc of metanotum black, anterior margin red. Three rather broad, confluent, black stripes on dorsum of thorax, the lateral ones abbreviated before and behind, and the middle one still more abbreviated behind; front and hind metatarsi tinged with black on inside edge. If this species and *texana* are synonymous, the former is doubtless the typical form. It should be noted that this species shows, though somewhat less noticeably, the triangular smooth space on hind margin of eyes, which is so noticeable in *Conops fronto* Will. The legs are hardly as thickened as usual in *Physo cephala*.

26. **Physo cephala tibialis** Say.

Constantine, Mich., August 31; one male. Dixie Landing, Va., August 7 and 19; two males. The Michigan specimen has hind tarsi red on basal joints.

27. **Zodion fulvifrons** Say.

Las Cruces, N. Mex., June 4 to September 27; seven males and one female. Also a male from Colorado (Gillette). Length 5.5–7.5 mm. All the males have the abdomen reddish yellow and silvery pollinose, the reddish interrupted stripes more or less distinct. The female has them more distinct, and darker.

Ottawa, Canada (Harrington), June 16; one male. Length 5 mm. Agrees very well with Williston's description.

28. **Zodion splendens** Jaenn.

Zacatecas, Mex., August 12; one female. Length 8 mm. It agrees quite well with Jaennicke's description, somewhat better with Williston's description of *Z. leucostoma*, but I believe both are the same species. The oblique pollinose markings of second segment unite somewhat indistinctly into a band. The anterior border of fifth segment is shining polished reddish; the sixth segment is only pollinose on disc, leaving the edges polished brown, the pollinose portion being transversely wrinkled. Extremity of abdomen polished dark brown, enlarged. Wings light yellowish at base; only last tarsal joint (not last two) is blackish; arista not black.

Las Cruces, N. Mex., June 21 and August 18; two, male and female, specimens. The male has the pairs of spots on fourth and fifth segments better defined and more rounded.

29. **Oncomyia baroni** Will.

Hanover, N. H. (C. M. Weed); one female. Agrees with description. Length 5 mm. This species seems to differ from *O. loraria* principally in being decidedly larger.

30. **Oncomyia loraria** Lw.

Takoma, D. C., September 20; one female. Agrees closely with Loew's description. The cheeks, particularly, have a silvery lustre, also the outer surface of tibiæ. Length slightly over 3.5 mm. The tarsi are all blackish, but bases of tibiæ are all slightly testaceous; the second joint of proboscis is slightly longer than the first; and the second joint of antennæ is no longer than the third. In this latter character it approaches *O. baroni*.

31. **Myopa pictipennis** Willist.

California (Ehrhorn). One specimen.

32. **Stylogaster neglecta** Will.

Riley County, Kansas (F. Marlatt), July; one female. Proboscis not yellowish at base; second abdominal segment yellowish above; third, fourth and fifth, more brownish, white pilose anteriorly; ovipositor yellow at base.

ŒSTRIDÆ.

33. **Cuterebra americana** Fab.

San Francisco Mt., Arizona. One male taken on plateau a few (about ten) miles to the north of the mountain, July 5. The abdomen has a decided purplish blue reflection; the scutellum is subopaque black. Thorax moderately shining; the golden yellowish pile on pleuræ contains, in its upper edge anteriorly, a rounded section of black pile, and a less well-defined patch of black pile touches its lower edge; just anterior to the last is a polished black glabrous area; still anterior to which is a third and smaller tuft of black pile. The venter is entirely black, but shows indications of the efflorescence in having an opaque surface containing the round, shining, purplish spots. Length 19.5 mm.

34. **Cuterebra fontinella** Clark.

Fort Collins, Colorado (Gillette); one specimen, 22 mm. long. See "Insect Life," v, pp. 319–320, for note on this specimen.

35. **Gastrophilus equi** Fab.

Cinchona, 5000 feet, Jamaica (W. Harris); two females, August (see Notes from the Museum, No. 73, Institute of Jamaica, Jan. 26, 1894).

TACHINIDÆ *s. lat.*

36. **Trichopoda arcuata** Big.

This species, which Bigot described from Chili, I believe to be a synonym of *T. mexicana* Meq., so far as I can judge from the descriptions.

37. **Trichopoda histrio** Walk.

Inverness, Fla., and southern Illinois (Robertson). One specimen from each locality in Mr. Robertson's collection (Robt. in litt.). I use this name for *T. trifasciata* Lw., which I have shown to be a synonym of it (Proc. Ent. Soc. Wash., ii, 139).

38. **Trichopoda mexicana** Meq., Dipt. Ex., Sup. i, 172.

Macquart described the female as there designated. The species differs from all those I know by having the first two antennal joints testaceous.

39. **Xysta** sp.

See "Can. Ent.," 1881, p. 150, for note on *Xysta* sp. from New Hampshire.

40. **Hyalomyia celer** n. sp. ♀.

Eyes cinnamon-brown, closely approximated, almost touching in front of the ocelli; frontal vitta triangular, velvety black, with a row of black hairs on each side; a short bristle at each vertical angle, and a pair within ocelli directed strongly forward; sides of front, sides of face, face, cheeks and occiput silvery, the occiput a little more inclining to plumbeous; epistoma prominent, produced, no decussate vibrissæ, the facial ridges with hairs to tips of antennæ; sides of face bare, cheeks with gray hair; antennæ black, third joint somewhat silvery, wider than second, but little longer, rounded; arista thickened little more than half its length, 3-jointed, first two joints short; proboscis brownish or blackish, longer than height of head, somewhat fleshy, labella well developed; palpi rather long, slender, knobbed at tip, blackish; occiput sparsely black hairy. Thorax and scutellum shining black, faintly silvery in some lights, humeri and pleuræ more distinctly silvery; scutellum with an apical and lateral pair of bristles. Abdomen clothed with short black hairs, shining, black at base; the last three segments cinereous pollinose, black punctate. Legs black, claws and pulvilli somewhat elongate. Wings gray-hyaline, veins pale yellowish brown; tegulæ whitish, halteres rufous. Length 4 mm.; of wing, 3.5 mm.

Described from one specimen. Las Cruces, N. Mex., June 18; on flowers of *Aster spinosus*.

41. **Hyalomyia celer** or n. sp. ♂.

Differs from *H. celer* ♀ only as follows: Silvery, sides of front a little wider, constricting the frontal vitta posteriorly; epistoma not prominent, not produced; arista thickened a little less than half its length; palpi not so much thickened at tip; hypopygium distinct, large, extruded; claws and pulvilli rather elongate. In all other respects like the preceding. Length slightly more than 4 mm.; of wing about 3.5 mm.

Described from one specimen. Las Cruces, N. Mex., June 3; on flowers of *Aster spinosus*. This may be the male of *H. celer*.

42. **Gymnosoma fuliginosa** R. D.

I believe this to be distinct from the European *G. rotundata* L., after comparing three males of the latter with a series of the American males. The European male has the face more silvery, and the antennæ almost entirely black. The American male has the face with a brassy tinge, and the antennæ very largely fulvous.

The European specimens were kindly sent me by Mr. v. d. Wulp and Mr. v. Röder.

While on the subject of the genus *Gymnosoma*, it may be well to point out that Macquart (Dipt. Ex. Sup. ii, 81) records the occurrence of *G. rotundata* Mg. (so identified by him) from Tasmania, saying, also, that it exactly resembles the European form. This, therefore, gives *Gymnosoma* a range in the southern Hemisphere, but in the temperate regions. It is not a tropical genus. I doubt Macquart's specific determination, however.

43. **Cistogaster immaculata** Meq., Dipt. Ex. ii, 3, 76.

Gymnosoma occidua Wlk. and *Cistogaster divisa* Lw. are synonyms of this species. Macquart and Loew described the male, and Walker the female.

In connection with this species, there is an interesting point to be decided. Having examined an extensive series of *Cistogaster*, which I believed to belong to this one species, although there was much variation among the females, I found that I could readily separate the individuals of the latter sex into two constant series. As there did not seem to be any constant differences in the males, in fact very little variation if any, it occurred to me that there might be a case of dimorphism among the females of this species, the normal form being that described by Walker, and also by Williston (Trans. Am. Ent. Soc. xiii, 296). This form has the mesoscutum shining black, with three distinct white pollinose vittæ (scutellum pollinose), the abdomen with a median similar vitta and two or three similar cross-bands or fasciæ, and is larger than the male. The other form of the female approaches the male in both size and the color of the abdomen, having the latter more or less red, especially anteriorly on the sides, the rest blackish, but not showing the cross-bands or median vitta more than in the male; the principal difference, however, is in the color of the mesoscutum (including the scutellum), which is

shining black without the white pollinose vittæ of the normal female, or the brassy pubescence of the male, only white pollinose on humeri and plenræ. The sides of front also are more black, with less silvery. I thought to consider this a case of dimorphism, rather than to consider as distinct the latter form, which approaches the male in general habitus. The capture of pairs *in coitu* will be needed to confirm or refute the supposition.

However, Mr. Charles Robertson, of Illinois, in correspondence with me on the above point, writes that he can differentiate the males, and believes, therefore, that there are two distinct species to be distinguished in both sexes. This may be so, and the fact that individuals of the same sex, in two nearly allied species, are sometimes hardly to be separated favors this view. I quote Mr. Robertson's letter in full so far as it pertains to this subject, and confess that his views seem very probable.

"Put in a row all males having a longitudinal fuscous stripe on the abdomen. In a parallel row put all males in which this fuscous stripe is wanting. Then in line with the first set put the 'normal' females and in line with the second set put the 'dimorphic' females. It will be noticed first that the fuscous stripe also bears a pollinose stripe and indicates a connection with the normal females which have a pollinose stripe down the abdomen. Then it will be noticed that the first set of males runs larger than the second, which goes to show that they are distinct, and that they belong to the 'normal' females which also run larger than the 'dimorphic' females. In the large males it will be seen that the first posterior cell varies from closed to petiolate as in the normal females, while the small males have the cell more petiolate, as in the 'dimorphic' females. Then it will be observed that the bend of the fourth vein is more rounded in the small males, and generally more angulate in the large ones. Comparing the abdomens of the two sets of males with those of the corresponding females will show that they agree in the distribution of pollen, which I think is very important. Probably other points will be found, but if the specimens are arranged as I have suggested, and each specimen in the one row compared with the one standing opposite in the other row, I am satisfied the conclusion will be drawn that there are two distinct species which can be separated easily, though the males are a little harder to separate than the females, a very common thing in closely allied species.

"I have considered that black specimens of the 'dimorphic' females were the same as *C. pallasii* Towns., but the small species is really a redder one than the large."

In case it is shown that there are two species in the above forms, Macquart's name will still stand for the species which possesses the "normal" females, and Walker's name will still remain a synonym because he described the "normal" female. Loew's name, however, can be applied to the species possessing the "dimorphic" females, which will thus be known as *C. divisa*.

44. **Oeyptera enchenor** Walk.

Illinois (Forbes); twenty specimens, measuring 8–10.5 mm. Of *O. dosiades* Walk., there were ten specimens from same locality, measuring 5–7.5 mm., and all normal in size and color. Though it is difficult to separate these two forms, yet it hardly seems probable that they are all the same species. Dr. E. Giglio-Tos doubtfully unites them in his recent work on Mexican Diptera (Ditt. Mess., iii, p. 1). The differences in size are too great, I believe, to admit of this view.

45. **Hemyda aurata** R. D.

I have four specimens from Illinois (Forbes), and one from State of Washington (Williston). Two of the Illinois specimens are males and two females. The Washington specimen is a female. The female is the smaller, has the shorter claws and pulvilli, and the pale yellow markings of the abdomen are not so heavy. The front is about one-third the width of the head in both sexes. R. D. says that, in *H. aurata*, the posterior half of the second segment is pale testaceous. In the above five specimens the second segment is broadly pale yellow on the sides, the yellow being separated by a median black vitta which broadens out and forms the hind margin of the segment. The pale yellow anterior fascia of third segment is very narrow and interrupted in the middle in the females, but is much broader, and with a tendency to become entire anteriorly in the males. I consider the above specimens, however, the same as Desvoidy's species, which is doubtless the only species of this genus in North America or elsewhere.

PSEUDOHYSTRICIA Brauer and v. Berg.

General characters.—Robust species with spiny macrochætæ, having the facies of *Dejeania*, but easily distinguished by the hairy eyes. Belongs to the Hystriciinæ. Head quadrilateral in profile; front of male twice as broad before as at vertex, more than one-third width of head in middle, prominent in profile, face nearly twice as wide; frontal bristles strong, descending about as low as base of third antennal joint, vertical bristles and about next four pairs directed backward, rest inward and decussate; no orbital bristles in male. Face a little receding, epistoma very prominent; facial depression more than one-half width of face, oval in outline, shallow; facial ridges bare, except several bristles next vibrissæ, constricted below; sides of face wide, clothed with some fine long hair; cheeks very wide, fully three-fourths of eye-hight, hairy posteriorly; vibrissæ strong, inserted a good distance above oral margin. Eyes quite

thickly hairy. Antennæ shorter than face, second joint elongate, third about one and one-half times as long as second, only moderately wide, convex before, straight behind; arista microscopically pubescent, thickened most of its length, 3-jointed, first two joints very elongate. Proboscis fully as long as hight of head, rather slim, elongate, labella developed; palpi long, spoon-shaped, extending more than one-third their length beyond the epistoma. Thorax much wider than head; scutellum and abdomen densely set with spiny macrochætæ. Abdomen much wider than thorax, rounded and swollen. Legs moderately long, tibiæ spiny; claws and pulvilli of male very elongate. Wings longer than abdomen, without costal spine, third vein with some weak bristles at base; apical cell widely open, ending well before tip of wing; fourth vein curved suddenly at a right angle, apical cross-vein strongly bowed in at its origin; posterior cross-vein sub-sinuate, very oblique, nearer to bend of fourth vein; both cross-veins nearly parallel with hind border of wing. Type, *Hystricia ambigua* Macq.

46. **Pseudohystricia ambigua** Mcq. ♂.

Eyes and frontal vitta brown; sides of front cinereous, with black hairs among frontal bristles, and gray hairs along the vitta; face and cheeks entirely cream-colored, sides of face with long and fine gray hair, cheeks with gray hair posteriorly; antennæ and arista black, the second antennal joint with a stout bristle before; proboscis shining black, brown at base and tip, palpi golden-yellow, brownish toward base; occiput cinereous, thickly clothed with yellowish gray hair. Thorax brassy, clothed with macrochætæ and grayish hair, pleuræ golden with a bunch of long yellowish hair, mixed with which are black bristles; scutellum pale flesh-colored, densely set with macrochætæ, the anterior lateral portion only being without them; hypopygium considerably exserted, black, hairy. Legs black, front femora golden on outside, front and middle femora with golden gray hair, femora and tibiæ bristly; claws and pulvilli very long, orange-yellow. Wings more or less smoky golden, yellow at base and narrowly along costa; tegulæ nearly white, with yellowish borders; halteres golden-brown. Length of body, 14 mm.; of wing, 13 mm.

Described from one specimen; Guanajuato, Mexico (Dr. Alfredo Dugès).

47. **Pseudohystricia exilis** Towns.

Cichona, Jamaica; several specimens from Mr. W. Fawcett, August and September.

48. **Saundersia bicolor** Will.

San Francisco Mt., Arizona; on large yellow composite in spruce zone, one female specimen, July 15. Recorded from New Mexico, Arizona, California, Washington. I very much suspect that van der Wulp's *S. bipartita* is the same species. It is described from Durango Mexico, 8100 feet, and Cache, Costa Rica. Colorado (Gillette); one specimen.

49. **Saundersia signifera** Will.

Colorado (Gillette); one specimen.

50. **Jurinia algens** Wd.

San Francisco Mt., Arizona; found from base to summit. Most abundant in spruce zone; more in fir zone than at base; sixteen specimens (three coll. by Cordley), July 15; *in coitu* this date. Two from Hart Little Spring, July 14. Of these eighteen specimens, twelve are males and six females; the male may be known by the elongate claws, and the exserted hypopygium. Two other secondary sexual characters are quite constant: the occipital pile of male is more clearly light brassy yellow, that of female deeper or more of a buff-yellow; and the front of the male is more silvery-white pollinose, that of female being more of a golden-yellow pollinose. This species ranges from Colorado and Wyoming through Dakota, Michigan, Canada and New York to New Hampshire and Maine.

Colorado (Gillette); one specimen bred from *Hadena lignicolor*.

51. **Jurinia apicifera** Wlk.

Colorado (Gillette); one specimen bred from *Clisiocampa californica*. This specimen has the face somewhat less golden than specimens from Michigan. Northern specimens of Tachinidæ seem often to have the colors more deeply marked than those from more southern localities.

52. **Jurinia hystrix** Fab. var.?

Colorado (Gillette). A single specimen seems near to *J. hystrix*, and may perhaps be considered a variety of that species.

53. **Jurinia** n. sp. (?) aff. *lateralis* Mcq.

Differs from female of *lateralis* as follows: First joint of arista much longer, about as long as second joint, distinct bristly hairs on sides of face below near eye margin; front, thorax and abdomen very similar in all respects, even including the orbital and frontal bristles, but general form not quite so widened, and anal segment without the yellowish silvery efflorescence, wholly shining instead. Abdominal macrochætæ apparently quite the same; third antennal joint dark brown. Length hardly 10 mm.

San Francisco Mt., Arizona; one female near base of mountain, July 14 (Cordley). This is near, but very distinct from *J. lateralis*, with which it might easily be confused from its great similarity.

A male specimen, from Hart Little Spring, near the base of the mountain, July 14, is longer than the preceding, but is sufficiently like it to be in all probability the same species. It agrees with it in all the characters above outlined in contradistinction to *lateralis*, except, of course, in the orbital bristles, but the antennæ are wholly pale reddish including the third joint.

54. **Blepharipeza bicolor** Mcq.

Colorado (Gillette); two specimens.

55. **Blepharipeza jurinioides** n. sp.

Length 13 mm.—Stout and unusually spinose, with the facies of *Pseudohystricia* or *Jurinia*, but distinguished by its ciliate hind tibiæ; front black, partly concealed by silvery pollen; frontal vitta spot soft dark brown; facial depression, sides of face and cheeks, silvery pollinose. Antennæ brown, the second joint moderately short, the third joint very long, nearly linear, reaching almost to epistoma; palpi brownish, yellowish apically; posterior orbits and occiput silvery pollinose. Thorax brownish black, thinly silvery pollinose, leaving five narrow vittæ, the three inner ones abbreviated behind, the outer ones interrupted at suture; scutellum and abdomen shining black, densely spinose, spines deep black. Abdomen broad and rounded oval, the surface with a faint metallic bluish shade. Legs dark or blackish brown, femora silvery outside, hind tibiæ black ciliate, pulvilli yellowish. Wings hyaline, blackish at base; tegulæ fuscous.

Cinchona (5000 feet), Jamaica (W. Faucett); one female. Type in coll. Townsend.

56. **Belvosia ferruginosa** n. sp.

Length nearly 12 mm.—Eyes green in life; front brownish red on each side, more or less silvery pollinose; frontal vitta soft brownish golden; facial depression, sides of face and cheeks, rich silvery white pollinose, cheeks hairy. Antennæ dark brown, the third joint linear and nearly three times as long as second; arista brown; palpi brownish black, yellowish on tips; vertex somewhat yellowish; posterior orbits silvery white. Thorax and scutellum brownish red, the former thinly pollinose before, leaving the beginnings of four narrow vittæ; posterior corners of mesoscutum yellowish, also a little yellowish behind humeri. Abdomen of a beautiful iron-rust yellow, in the first and second segments the yellow shade predominating, in the third and fourth the iron-rust shade; first segment brownish under scutellum; a median pair of macrochætæ on first and second, a marginal row on third and fourth segments. Legs soft blackish, pulvilli and claws yellow. Wings uniformly pale fuscous; tegulæ same color.

Bath, Jamaica (E. M. Swainson); bred from a lepidopterous chrysalis; one male. A beautiful species. Type in coll. Townsend.

57. **Echinomyia hæmorrhoa** v. d. Wulp, Williston.

San Francisco Mt., Arizona. Quite well up the mountain, probably in spruce zone. Three males and two females, July 15; also one male near base (Cordley), and another male at Hart Little Spring, both July 14. I am quite satisfied that this is the species referred by Williston to *hæmorrhoa*. In my specimens the third antennal joint is larger in the male, the abdomen (of male) is dark red on the sides and with the anal segment largely blackish shining. The anal segment of female has the silvery efflorescence, but that of the male is quite uniformly without it, only exceptionally showing traces of it. There is a very small cloud on anterior cross-vein in the males, not apparent in the females.

58. **Echinomyia iteraus** Walk.

San Francisco Mt., Arizona; in spruce zone; three females (one coll. Cordley), July 15. This species belongs in the subgenus *Pele-*

teria of R. D., by virtue of its having two macrochætæ or bristles on side of face near lower margin of eyes. The subgenus *Echinomyia* s. str. is without these bristles.

59. **Echinomyia thomsoni** Willist.

San Francisco Mt., Arizona; in spruce zone. Three females (one coll. Cordley), July 15; also one female, Hart Little Spring, July 14; and one male, Cocanini Plateau to the north of the mountain, July 6.

Colorado (Gillette); one specimen bred from "unknown larva on clover."

60. **Echinomyia** n. sp.?

La Vega de San José, Valencia County, New Mexico; two specimens, male and female, August 4. Flagstaff, Ariz., July 2, a smaller female. This species is very similar to *E.* (*Peleteria*) *iterans* Wlk., but may be distinguished not only by the absence of the two bristles on sides of face below near eye margin, which pronounces it an *Echinomyia* s. str., but also by the more cinereous or grayish pollinose prothorax. In *E. iterans*, the prothorax is of a more shining brassy pollinose shade, and the fine thoracic lines are more distinct. In the present species the first two joints of antennæ, and sometimes the base of third, are of a lighter and more dilute reddish than in *E. iterans*. The abdomen is marked the same, except that the anal segment seems to lack, as a rule, the silvery pollinose sheen.

61. **Atropharista** Towns.

This genus should undoubtedly be subordinated to *Melanophrys* Willist., and *A. jurinoides* referred to that genus. It does not belong in the Hystriciinæ, but in the Tachininæ.

62. **Hystrichia aldrichi** Towns.

This is probably a *Nemorœa*. It comes near *N. obscurella* v. d. Wulp, but differs in having only four thoracic vittæ, and the abdominal segments with both marginal and discal macrochætæ.

63. **Gonia sagax** Towns.

Illinois (Forbes); one specimen. It has the antennæ not so bright orange, but of a duller color. Length 9.5 mm.

64. **Argyrophylax** sp.

Colorado (Gillette). A specimen, apparently belonging to this genus, was bred from *Philampelus achemon*.

65. **Siphoplagia anomala** Towns.

What I take to be a male specimen of this species (southern Illinois, Robertson) has the abdomen slightly narrowed, with the pollen more of silvery than a cinereous shade.

66. **Cnephalia** sp.

Mesilla Valley of the Rio Grande, New Mexico. A characteristic species of this genus is numerous in individuals about Las Cruces.

67. **Trichophora** sp.

Six specimens from southern Illinois (Robertson) I refer to this genus. Mr. v. d. Wulp remarks on the doubtful distinctions between this genus and *Cuphocera* (Biol. Cent.-Amer., Dipt. iii, 35–36). The two genera seem well marked. *Cuphocera* differs by its more elongate abdomen and general narrower form, and should include *C. ruficauda* v. d. W., which has an elongate abdomen. The present species of *Trichophora* has a short, stouter abdomen, and general much stouter form. It differs from *Echinomyia* only in the entire absence of palpi, the third antennal joint being about as long as the second, and the frontal bristles descending in a double row below near the eye margin (the so-called genal bristles). The second and third abdominal segments have only marginal macrochætæ.

The character of the comparative length of the second and third antennal joints does not seem to be rightly understood in the three genera *Trichophora*, *Cuphocera* and *Echinomyia*. The last has the third joint shorter than the second. *Cuphocera*, according to the type species, should have the same characteristic, but specimens which I identify as *C. macrocera* Wd. and *C. ruficauda* v. d. W. have the third joint fully as long as the second, or a little longer. These two species, moreover, agree in their general elongate form, very noticeable in the elongate abdomen, and thus would be readily separated from the shorter, stouter species of *Trichophora*. The species of *Trichophora* above referred to may be distinguished at once from *T. nigra* Meq. by having two bristles on the sides of face near lower margin of eyes, instead of one as in that species; and from *T. analis* Sch. by the anal segment being wholly rufous, and the other segments blackish, the sides of the anal segment in *T. analis* being broadly black and the rufous extending on sides of second and third segments.

68. **Tachina clisiocampæ** Towns.

Colorado (Gillette); one specimen bred from *Danais archippus*. The front is less golden than in the type from Maine. Sides of abdomen more distinctly red; scutellum more generally rufous. Another specimen, which I refer here with some doubt, was bred by Prof. Gillette from *Clisiocampa californica*.

69. **Tachina** sp.

Colorado (Gillette). A species with a *Plagia*-like facies. One specimen bred from *Plusia brassicæ*.

70. **Tachina** sp. (s. str.)

Colorado (Gillette). One specimen reared from a larva of *Coptocycla*. This is probably a new species of *Tachina* (in the narrow sense).

71. **Miltogramma cinerascens** Towns.

A specimen from southern Florida (Robertson) agrees with the types of this species in all respects, except that the face and cheeks are a little less deeply golden or brassy pollinose, but have somewhat more of a silvery shade. I will not venture to describe it as distinct.

72. **Miltogramma trilineata** v. d. W.

Two male specimens from southern Florida (Robertson), collected February 16 and March 10, I refer to this species. They seem to have the abdomen slightly more silvery than a specimen from southern Illinois, but are otherwise identical.

These two species both differ from Schiner's description of *Miltogramma* by not having the first abdominal segment shortened, and by having the frontal bristles moderately strong. From his description of *Macronychia* they differ in their smaller size, and the abdomen being rather short conical. They agree with *Eumacronychia* in having one row of frontal bristles, and the orbital bristles present in both sexes. The front is about one-fourth width of head (in both sexes?).

73. **Eumacronychia decens** Towns.

Seneca Ranch (north of Springerville), Arizona; one male, June 25. Also one female, Zuni River, Arizona, July 28.

74. **Eumacronychia elita** Towns., Trans. Am. Ent. Soc. xix, p. 100.

This species bears much superficial resemblance to the genus *Gymnoprosopa* Towns., more than does *E. decens*. The following differences may be pointed out between it and that genus: Front fully one-third width of head in male, a little more prominent; frontal bristles weaker, more nearly equal; two orbital bristles in male. Facial depression about one-third width of face in male; sides of face rather wide; cheeks wide, nearly one-half eye-height. Eyes descending little over two-thirds as low as oral margin; second antennal joint rather elongate, third joint about twice as long as second; proboscis about as long as height of head, not stout; scutellum with two lateral pairs of macrochætæ, but with apical decussate pair wanting. Abdomen cylindro-conical, first segment not shortened; hypopygium exserted; pulvilli of male elongate, claws short; fourth vein with a quite distinct wrinkle at bend, apical cross-vein only slightly concave, apical cell narrowly open and terminating well before tip of wing.

75. **Masicera** sp.?

Southern Illinois (Robertson); one specimen. This differs from the genus *Masicera* in its elongate, rather narrowed abdomen with the macrochætæ only marginal, in the general elongate form, and in the frontal bristles descending on sides of face nearly as low as the vibrissæ. It will probably form a new genus.

76. **Olivieria** n. sp.

Southern Illinois (Robertson); one male I refer to this genus. It agrees with Schiner's description of *Olivieria*, in all points except following: Eyes very distinctly hairy, instead of thinly so; proboscis a little longer than height of head, palpi a little thickened terminally; first abdominal segment hardly shortened; apical cell open.

77. **Nemoræa** n. sp.

Southern Illinois (Robertson); three males and two females. This species differs from *N. aldrichi* (descr. as a *Hystricia*) in having the anal segment rufous, and sides of other segments frequently so as well. It differs from *N. variegata* v. d. W. in having the third antennal joint hardly longer than the second. From the description of *N. leucania* Kirkp., it differs only in the same character—the length of the third antennal joint, which in that species is said to be two and a half to three times as long as second. The antennæ vary from wholly black to black with the second joint clear rufous.

78. **Nemoræa** n. sp.

Colorado (Gillette); one bred from *Ecpantheria permaculata*.

79. **Mystacella** n. sp.

Colorado (Gillette); one specimen bred from *Acronycta americana (?)*; and another from *Pyrrharctia isabella*.

80. **Hyphantrophaga hyphantriæ** Towns.

Colorado (Gillette); one bred from *Vanessa milbertii*.

81. **Hyphantrophaga** n. sp.

Colorado (Gillette); two specimens bred from *Vanessa milbertii*. This is very near to, but different from, *H. hyphantriæ* Towns., and is probably a new species.

82. **Exorista theclarum** Scudd.

E. chrysophani Towns., "Ent. News," 1891 (December), pp. 197–198, is a synonym of this species.

MYOBIA Rob. Desv.

General characters.—Yellowish species, considerably resembling *Clytia*, but readily distinguished by the very large palpi. Belongs in Thryptoceratinæ. Head nearly rectangular in profile; front rather prominent, about one-third width of head, frontal bristles

descending almost to base of third antennal joint; vertical bristles strongest, and, with next two pairs, directed backward, others inward; two orbital bristles in the female. Face nearly perpendicular, epistoma prominent; facial ridges bare; sides of face not wide, bare; cheeks about as wide as one-third the eye-height, bare; vibrissæ inserted almost on oral margin. Eyes bare. Antennæ not quite as long as face, second joint a little elongate; arista pubescent, thickened on basal half, indistinctly 3-jointed, second joint not elongate; proboscis rather slender, considerably longer than height of head, labella considerably developed; palpi unusually large, club-shaped, elongate, extending one-third their length beyond the epistoma, much thickened at tip. Thorax about as wide as head; scutellum with a subapical pair of macrochætæ, which are not decussate, and a lateral pair, besides several very weak ones. Abdomen a little wider than thorax, broadly rounded, first segment hardly shortened; macrochætæ only marginal. Legs somewhat elongate, not very bristly. Wings longer than abdomen, without costal spine, first vein spined its whole length, third vein spined as far as the small cross-vein; apical cell ending in the apex of the wing, open; fourth vein bent at a curve, without stump or wrinkle; hind cross-vein a little nearer the bend of the fourth vein, apical cross-vein slightly concave. Type, *M. diadema* Wd.

83. **Myobia diadema** Wied. ♂.

Eyes cinnamon-brown; front light yellow, frontal vitta same color; face and cheeks whitish, the sides of face with a golden tinge; cheeks with some bristles on lower border; antennæ orange-yellow, dark brownish at tip, joint with a long bristle before; arista dark brown; proboscis yellowish, palpi orange-yellow, clothed with short black bristles; occiput whitish below, cinereous above, except vertex, which is yellowish, sparsely clothed with gray hairs, fringed with some black bristles above. Thorax dark cinereous with a pair of narrow, black, median vittæ becoming obsolete at the suture, and a longer, lateral vitta interrupted at the suture; humeri and plenræ yellowish; scutellum yellowish. Abdomen clothed with short, black, bristly hairs; first segment yellowish, second segment yellowish, except median portion and hind borders, last two segments brownish yellow; first segment with a very small median marginal pair of macrochætæ, and some lateral bristles on sides; second segment with a median marginal pair and a lateral pair, third segment with eight or more marginal, and last segment with six or more marginal macrochætæ; venter light yellowish at base, darker at tip, anus blackish. Legs with a few sparse bristles, light yellowish except tarsi, which are blackish; first tarsal joint much elongated; claws and pulvilli short. Wings grayish hyaline, the portions along wing-veins tinged with yellowish; tegulæ light yellowish, especially on borders; halteres light yellowish. Length of body, 7 mm.; of wing, about 6 mm.

Described from one specimen, Ithaca, N. Y. (Comstock), July 19.

84. **Atrophopoda singularis** Towns.

On pp. 373–375 of Trans. Am. Ent. Soc., vol. xviii, I gave a description of the new genus *Atrophopoda*, from two specimens from Illinois. Although both sexes are indicated in the description, I believe that I had females only under inspection. In a collection of Tachinidæ sent me by Prof. Forbes, from Illinois, I find 27 specimens which seem to be this species. Of these, 12 are the typical form of my descriptions, and are apparently the female sex, while 15 are apparently the same species, and if so, must be considered the males. They differ by having the eyes pronouncedly hairy, the antennæ greatly enlarged and hypertrophied, and the claws and pulvilli of all the feet elongate—the same form described by me as *Lachnomma* in Trans. Am. Ent. Soc., xix, pp. 103–105. I desire to point out the possibility of these two forms being male and female, since the suspicion has come to me. If it is so shown, the name *Atrophopoda* has priority over the other. Some of the *Lachnomma* form are much smaller than the typical. However, the typical specimens of *Lachnomma* do not possess the vittate thorax characteristic of the above specimens.

85. **Epigrimyia polita** Towns., Trans. Am. Ent. Soc., xviii, 375–376.

One specimen from southern Illinois (Robertson) does not differ from the type described from D. C. It was taken by Mr. Robertson on flowers of *Blephilia* sp.

86. **Pseudomyothyria** n. sp.

Length 4.5 mm.; of wing, 3.5 mm.—Eyes brown, frontal vitta brown; sides of front, face and cheeks silvery; two orbital bristles, directed strongly forward and a little outward; antennæ and arista black, third antennal joint four times as long as second, rather stout; proboscis brown, palpi pale rufous; occiput cinereous, sparsely hairy. Thorax silvery, with four narrow blackish vittæ anteriorly; scutellum blackish, silvery pollinose. Abdomen shining black, bases of second to fourth segments broadly silvery pollinose, the third segment faintly and the fourth markedly with a golden shade; second and third segments have the pollen divided by a non-pollinose black median band; first and second segments with a median marginal and a lateral marginal pair of macrochætæ, third with eight marginal, anal armed with marginal and submarginal macrochætæ. Legs black; pulvilli and claws small. Wings grayish hyaline, tegulæ white; halteres brownish testaceous.

Southern Illinois (Robertson). This species differs somewhat from the type of the genus in not having the facial ridges ciliate more than half way up the face.

87. **Vanderwulpia atrophopodoides** Towns.

Socorro, N. Mex., August 8; one specimen.

88. **Scopolia** n. sp.

Southern Illinois (Robertson); one specimen. Differs from Schiner's description of *Scopolia* by having a more nearly ovate, instead of a

conical abdomen. The abdomen is rather shorter than elongate. I notice that *Scopolia sequax* Will. is described as having the abdomen ovate also.

89. **Scopolia** sp.

Colorado (Gillette); probably a new species. One specimen bred from a leaf-roller on choke cherry.

DEXIIDÆ.

90. **Scotiptera** n. sp.

Southern Illinois (Robertson). One female I refer to this genus on account of the very short stump at bend of fourth vein, and the rather elongate proboscis. The third antennal joint is, however, not more than twice the length of the second. The front of female is narrower than the eyes at vertex, but in middle about as broad as eyes. The cheeks are somewhat more than half the eye height; the bristles on the legs are rather stout. In other characters it agrees with v. d. Wulp's generic description in the Biol. Cent.-Amer. Dipt.

91. **Chætona** n. sp.?

Colorado (Gillette). One specimen bred from *Ecpantheria permaculata.*

92. **Thelaira** n. sp.

Colorado (Gillette); one bred from *Pyrrharctia isabella.* Probably a new species.

93. **Thelaira** sp.?

Colorado (Gillette). One specimen, apparently of this genus, bred from *Ecpantheria permaculata.*

Another specimen of same genus as above, but of a different species, bred from *Pyrrharctia isabella.*

MUSCIDÆ.

94. **Ormia** sp.?

A male and female specimen from Forbes, Illinois, seems to agree with *Ormia* R. D., except in following points: Apical cross-vein is not bowed out, but is actually bowed in. The face is strongly carinate, which character is not mentioned by R. D. The male specimen is indicated by Forbes as bred from *Crambus* sp.

95. **Compsomyia macellaria** F.

Illinois (Forbes); twelve specimens, four males and eight females, three of them only 5–5.5 mm. Two of these three are females and one is a male; only one out of the twelve has the scutellum and thorax posteriorly metallic-blue, the others having these parts at most deep metallic-green; average length 7.5 mm.; one measures 8.5 mm.

Lignanea Plain (Kingston) and elsewhere in Jamaica. I have identified specimens of the adults sent me by Mr. Cockerell. The larvæ have been known for over a century as attacking man; also troublesome to animals (see Notes from the Museum, No. 63, Inst. of Jamaica, Oct. 26, 1893; and Journ. Inst. Jamaica, i, pp. 372 (Jones and Cockerell) and 378).

ANTHOMYIIDÆ.

96. **Mydæa spermophilæ** n. sp.

Length nearly 8 mm.—Eyes light cinnamon-brown; front rather narrow, widening anteriorly nearly in line with face; frontal vitta light brown, sides of front very narrow and silvery pollinose; whole face and cheeks yellowish silvery pollinose. Antennæ deep yellow with an orange tinge, second joint moderately short, third about three times as long as second; arista brown, feathery, yellowish at base; palpi yellow, with some short black hairs; proboscis fleshy, yellowish, brown at base; posterior orbits and occiput cinereous pollinose. Thorax blackish, silvery pollinose, leaving four black vittæ, the outer ones more interrupted at suture than inner ones; scutellum and abdomen black, thinly silvery pollinose, in a somewhat marmorate pattern on abdomen and a little more thickly towards bases of segments; venter silvery on sides, pale yellow on median basal portion. Legs brownish, femora darker basally and yellowish on lower side distally; coxæ and trochanters yellowish, tarsi dark; pulvilli yellowish. Wings clear hyaline, tegulæ whitish.

Kingston, Jamaica. One specimen bred, November 22, from a young *Spermophila*, probably *S. bicolor* L. Type in coll. Townsend.

Similar larvæ have been noticed at Cinchona (5000 feet), Jamaica, in nestlings. They have also been noticed in nightingale (*Mimus orpheus*) nestlings at Duncans, Jamaica (see Notes from the Museum, No. 70, Institute of Jamaica, Nov. 22, 1893; and Journ. Inst. Jamaica, i, pp. 381–82).

Mr. E. Stuart Panton has written me that he remembers seeing nestlings of *M. orpheus* on several occasions, many years ago in Jamaica (probably in Manchester), with two or three of these larvæ on either side of the base of the beak. The only case of the kind ever recorded, so far as I know, is that of *Hylemyia* (*Aricia*) *pici* Meq., the larva of which lives in a swelling on the wing of *Picus striatus* in Santo Domingo. A third case is that of another anthomyiid (different from the Jamaican one) which infests birds in Trinidad, and of which I will treat in a separate paper.

97. **Mydæa** sp.?

Colorado (Gillette). An anthomyiid, probably belonging to this genus, bred from *Pieris rapæ*.

MUSCIDÆ—ACALYPTRATÆ.

98. **Euxesta notata** Wied.

Uray, Colo. An adult of this trypetid was reared, October 30, by Prof. F. M. Webster, from a plant of *Oxytropis lamberti* collected at Uray, September 5.

99. **Lonchæa orchidearum** n. sp.

Length 1.5 mm.—Eyes dark brown, with a greenish tinge, probably greenish in life; front and face blackish, the former with several bristles near vertex. Antennæ black, very short, third joint rounded, arista short and comparatively rather stout. Thorax shining metallic black, with a hardly greenish tinge; scutellum with more of a greenish tinge. Abdomen deep metallic green, rather short and somewhat pointed apically. Legs blackish. Wings much longer than abdomen, clear hyaline, iridescent in oblique lights.

Kingston, Jamaica. One specimen bred, March 19, from a flower stem of an orchid (*Oncidium luridum*) brought from Kingston Gardens, February 22.

The specimen agrees well with Schiner's characterization of *Lonchæa*. The habit also agrees, as the larva of the European *L. nigra* Meig. has been found in the stems of *Verbascum*, *Angelica* and *Carduus*, while other species have a similar habit. The present species belongs to none of the three described by Wiedemann from the neotropical region, viz., *L. glaberrima* (W. L.), *chalybea* (Brazil), and *nigra* (Brazil), and, while in this connection, the name *nigra* Wied. (1830) is preoccupied by the European *L. nigra* Meigen (1826). Wiedemann's species may, therefore, be known as *L. wiedemanni*. Type in coll. Townsend.

100. **Drosophila** sp.

Vera Cruz, Mexico (Cockerell); bred in box of *Pulvinaria* and *Orthezia* from Vera Cruz, Mex. Probably issued from *Pulvinaria lutea* Ckll., a beautiful yellow coccid. Length about 2.5 mm. Eyes bright scarlet in life. Body of a general pale yellowish color. This is quite possibly *D. mexicana* Meq.

101. **Leucopis bella** H. Lw.

I identify a specimen from Colorado, bred by Prof. Gillette from plant-lice, as this species. It agrees very well with Loew's description, except that the second abdominal segment has two black spots and no small dot between them, or scarcely a faint trace of one. The antennæ are but little silvery. It must, however, be considered the same species. I should judge that Dr. Williston's *L. bellula* ("Insect Life," i, 258) is a very distinct species. *L. bella*, as described by Loew, has a median basal dot and two larger dots on the second abdominal segment, and a median dot on the third and fourth segments, while *L. bellula* has a pair of dots divided by a median line on each segment except the first.

ERRATA.

Page 35, lines 7 and 11; 49, line 8 from bottom; 43, line 18; and 44, line 24, read Proc. Cal. Acad. Sci. 1895.
Page 35, line 8, read *Microdon xanthopilis.*
" 43, line 17; and 44, line 23, read El Taste.
" 44, line 22, read *Volucella lucasana.*
" 45, line 8 from bottom, read *Volucella tolteca.*
" 48, line 11, read *Eristalis brousi.*
" 50, line 14 from bottom, read F. W. Urich.

STUDIES IN COCCINELLIDÆ.

BY GEORGE H. HORN, M.D.

The Coccinellidæ of Boreal America have been nearly completely monographed by Crotch (Trans. Am. Ent. Soc., 1873), who omitted *Scymnus* and the genera with small species. In 1880 (Trans. Am. Ent. Soc.) LeConte reviewed *Hyperaspis*. The Scymnides have never been studied since the earliest work by LeConte (Proc. Acad. 1852). The present paper was begun with the idea of supplementing the works above cited, having *Scymnus*, especially, in view.

In no family of the entire order have genera been so unnecessarily multiplied and founded on characters impossible of accurate definition, the work of Mulsant being an instance of minute subdivision in every respect. The later work of Crotch, while partly correcting this unnecessary subdivision, has in many places fallen into the same error. Chapuis (Genera Col. xii) has greatly simplified the classification in the number of the larger subdivisions of the family and of the genera.

As an instance of the difficulties met in the arrangement of the genera *Coccidula* may be taken as a beginning. This genus is separated from the other pubescent Coccinellidæ by the existence of some larger elytral punctures substriately arranged. While this will answer fairly for the European species and our *lepida*, it fails for *occidentalis*. LeConte has, however, suggested a more important character (Classif. 1883, p. 114) in the fact that the anterior coxal cavities are open behind.

In describing *Cephaloscymnus* (Trans. Am. Ent. Soc., 1873, p. 382) Crotch observes the same character. From this it is evident that the taxonomic value given it by LeConte cannot be accepted without unnaturally associating the two genera. From the characters proposed by Chapuis *Cephaloscymnus* should be placed in the Ortaliites, and I would remove *Novius* from the Scymnites to the same group.

Another difficulty arises in the species at present called *Pentilia* in our lists. By the arrangement suggested in the Classification these species fall in the Hyperaspites, but the table does not seem applicable outside of our fauna.

The species at present known as *Pentilia* in our lists must be placed in *Smilia* Weise (Deutsche Ent. Zeit. 1891, p. 285), and while they have no epipleural fossets as required in the Hyperaspites it seems unnatural to remove *Smilia* from association with *Lotis, Sticholotis* and *Cryptognatha*. In all these genera there are but five ventral segments, whereas in the other Hyperaspites there are at least six. The essential character of *Smilia* is the presence of an obliquely impressed line behind the anterior angles of the thorax. This line is scarcely visible in *misella*.

SMILIA Weise *Pentilia* ‡ Lec.

The species are all quite small, the largest being but little longer than one millimetre, the smallest less than one millimetre.

The species may be thus separated:

Impressed line of front angle of thorax very indistinct.
  Thorax smooth; sutural stria of elytra indistinct..... **misella.**
Impressed line distinct.
  Elytra uniform in color, piceous or black.
    Thorax distinctly punctate; elytra brownish, sutural stria distinct behind the middle.....**marginata.**
    Thorax not evidently punctate, but finely alutaceous, elytra piceous or black, sutural stria not evident..... ....**ovalis.**
  Each elytron with oval red spot, the two narrowly separated at suture.
    Thorax not punctate, sutural stria not distinct..... **coccidivora.**

S. misella Lec., Proc. Am. Philos. Soc., 1878, p. 400.
Widely distributed from Canada to Florida, Illinois to Texas.

S. marginata Lec., loc. cit.
Marquette, Mich., and Ithaca, N. Y.

S. ovalis Lec., loc. cit.: *Felschei* Weise, Deutsche Ent. Zeit. 1891, p. 288.
Florida. I have also specimens from southern California not distinguishable, except they are more evenly black in color; one is labeled "collected on *Pinus monophylla*."

S. coccidivora Ashmead, "Orange Insects" (printed privately), Jacksonville, Fla., 1880, p. 10.
Depredates on the scale insects of the orange.

CRYPTOGNATHA Muls.

The species of this genus are known from any others in our fauna by the prosternum in front forming a lobe concealing the mouth-parts in repose. The middle and hind legs are received when re-

tracted in depressions, and the knees form foveæ in the epipleuræ even to their outer edge. There is to be seen a faintly impressed line near the front angles of the thorax, closer, however, to the front angles and less impressed than usual in *Smilia*.

These species are known:

Black shining, head and sides of thorax often pale; length .07 inch. . **pusilla.**
Castaneous, thorax at middle broadly piceous; beneath black; length .06 inch. **catalinæ.**
Testaceous; length .035 inch. . . . . **pallida.**

C. pusilla Lec., Proc. Acad. 1852, p. 135; *puncticollis* Lec. loc. cit.

Broadly oval and convex, a few punctures on the head and thorax, surface otherwise polished.

Two forms occur which are probably sexual:

C. puncticollis is entirely black, the legs usually piceous or black.

C. pusilla has the sides of the thorax variably pale, head and legs bright yellow.

Occurs from Michigan to Georgia, westward to Nebraska and Arizona.

C. catalinæ n. sp.—Similar in form to *pusilla*, castaneous, middle of thorax and narrow space at base of elytra piceous, body beneath black, head and legs bright yellow. Head smooth, with a few short erect hairs. Thorax with few scattered punctures near the middle. Body beneath smooth, last ventral segment paler at middle. Length .06 inch.; 1.5 mm.

One specimen Catalina, S. Cal., sent me by Mr. H. C. Fall.

C. pallida Lec., Proc. Am. Philos. Soc. 1878, p. 400.

Precisely similar to *pusilla* in form and sculpture, but is very much smaller and entirely testaceous.

One specimen (cab. Lec.) Sand Point, Fla.

Serangium maculigerum Blackb. seems to belong to this genus. This is one of the Australian species, of which probably a few were introduced into California, but none have since been found. Specimens were sent me by Mr. Koebele.

SCYMNUS Kug.

The only attempt at a treatment of our species of *Scymnus* was made by Dr. LeConte in 1852 (Proc. Acad. Nat. Sci.), since which time nothing has been done other than the description of three new species by Crotch and three by LeConte. In that paper twenty-seven species were recognized, while seven described previously by Mulsant and Melsheimer remained unidentified, but have since been deter-

mined with but one exeeption. This condition forms a good basis for the resumption of the study of the species. In the "Zoology of Eugenies Resa" Boheman has deseribed three species—*atramentarius, californicus* and *infuscatus* as from San Francisco, which have not been identified, and from the well-known errors of locality in that work may be safely rejected from our faunal list, as well also *S. cyanescens* Muls., which seems to be of a style of coloration unknown in our species. *S. arcuatus* Rossi, a well-known European species appears in Crotch's "Check List" on the authority of a specimen in LeConte's cabinet the origin of which could never be ascertained. No other specimen has has ever been eaptured, and this name may also be dropped. In the "Catalogus" a *S. floridanus* Muls. is given. This was described as, and undoubtedly is, a *Hyperospis*. A recent examination of *S. nigripennis* Lec. shows it also to be a *Hyperaspis*.

The present attempt to study *Seymnus* is merely an endeavor to make a little advance, to separate our species with more certainty, and finally to place in the hands of students some information by means of which still better results may be obtained. The separation of the species is by no means an easy task, especially among those in which the elytra are tipped with red. *Seymnus* is one of those genera in which nominal species can be most easily separated with a paucity of material, the larger the series with the usual variations the greater the difficulty.

Seymnus varies in outline from broadly oval, in which the outline is practically continuous, to oblong in some cases with the thorax narrower than the elytra, thus interrupting the outline.

The surface is always pubescent, but in a variable manner among the species, as a general rule very sparsely in the species of the first two divisions. In those in which the pubeseenee is distinct the hairs may be arranged without order, or there may be a somewhat spiral arrangement giving the surface a holoserieeous appearanee. To the experienced eye this may be an aid in separating closely allied species, but from the fugitive nature of the pubescence no mention is made either of its existence or character in the descriptions which follow.

The head shows no characters of value in separating the speeies. It has been observed, by LeConte and Mulsant, that the head is in some species yellow in the male and piceous in the female, but this is not constant, as the head may be in either color in the two sexes. The antennæ are nearly always pale in color.

The thorax, always narrower in front, varies in form as shown in the sketches annexed. The basal marginal line is usually very distinct, rarely obliterated.

The elytra vary in outline with the form of the species, and are always confusedly punctured, from densely to very sparsely, and from coarse to very fine. In a series of moderate size the coarseness of the punctuation is a variable quantity, and species cannot be safely separated thereby. Those species in which there is color ornamentation show the usual variation of color characters, but it is remarkable that the extent of variation is so little in those species with the apex more or less red.

The epipleuræ are horizontal and without foveæ for the reception of the knees. There is, however, a partial exception in *caurinus*, a species of the third group.

The prosternum exhibits two modifications which are not so sharply defined as to enable the characters to be used for systematic purposes with certainty. In the species of the first two groups the prosternum is either flat or slightly convex without the ridges, while in the next two groups there is on each side a finely elevated line usually the entirely length of the prosternum, the two convergent in front.

The metasternum is usually smoother at middle than at the sides. On each side behind the middle coxæ there will be observed an elevated curved line beginning at the inner edge of the meso-coxal cavity curving backward and outward joining the suture between the metasternum and its episternum. In the first two groups this juncture occurs posteriorly to the anterior third of the suture, while in the next two groups the arc is more nearly complete the line joining the suture near the front, very often at the angle.

The abdomen is said to be composed of five segments, but in the first two groups there are six very distinct segments in both sexes, while in the next two groups the occurrence of the sixth segment is not frequently observed. Fearing that I had only females of the first two groups for examination I directed the attention of Mr. H. C. Fall, of Pomona, Cal., to the species which he might observe and from specimens collected in coitu it has been found that the sexes are alike in the number of segments and the male has no apical impression. The suture separating the first two ventral segments varies greatly in distinctness, being at times nearly obliterated at middle and sometimes as distinct at middle as at the sides. Mr. Blackburne (Trans. Royal Soc. South Aust. xv, 1892) restricts the

name *Scymnus* for those with the suture feeble at middle and proposes *Scymnodes* for those with the distinct suture. This character fails to have any value in our series of species.

The first ventral segment exhibits the character of greatest value in the division of the species in groups. Posteriorly to the coxal cavity is a slightly elevated line beginning at the inner edge of the cavity passing more or less obliquely and curved toward the first suture sometimes joining the suture and continuous with it, or running parallel with the suture or recurving to the front and when entire ending near the anterior angle of the segment. By some authors the area enclosed by this line is spoken of as the "abdominal plate," but in the present essay the more definite term "metacoxal line" has been adopted. In the species of the last two groups in this essay Dr. LeConte always mentioned the sculpture of the abdominal plates, but there has been observed a lack of constancy within specific limits and too little variation between the species to render the description valuable. As a rule, in the first two groups the area is finely punctured, or exactly as the rest of the superficial area, while in the last two groups the anterior portion is coarsely punctured and the posterior comparatively smooth.

The claws vary in form between the species and sometimes between the sexes. In some of the smaller forms of the first two groups the claws are simply dilated at base or feebly toothed. In the other species the claws are provided with an appendix sometimes of such length as to make the claw appear cleft, in these the female has a shorter appendix. Some interesting notes on this character among the species collected by him have been made by Mr. H. C. Fall, but beyond their mention in a general way I have not been able to utilize them.

The secondary sexual characters are not, as a rule, conspicuous. In the first two groups I have not observed any sexual differences. In the next two groups the fifth ventral of the male is impresso-emarginate in a not greatly varying degree. Occasionally the sixth segment is apparent when the impression is somewhat cupuliform. In the form considered *marginicollis* the male has on the first segment a small tubercle at middle near the suture with very short hair, while in *punctipennis* the male has a median smooth area, on each side of which is a narrow pubescent region. In *cervicalis* the males are very evidently less broadly oval than the females.

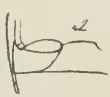
Color characters have their utility in the separation of species of *Scymnus*, but some care and no little experience is required in their use. In *guttulatus* the elytra may become almost entirely yellow, while in *nebulosus* the small black spots may be so numerous and large that the elytra appear almost entirely black. The legs vary in color. As a general rule the species of the first two groups have pale legs. In other species two colors exist—piceous and red. The former color will vary to testaceous, while the latter may become dark brown. It seems to me that too strict an insistance on the color of the legs as of specific value is not advisable from the known tendency to variation.

From the characters given in the preceding remarks and the comments upon them it is evident that primary groups based on the form of the metacoxal line afford the most natural arrangement of the species.

Metacoxal line incomplete.
Metacoxal line joining the first ventral suture.....Group A.
Metacoxal line parallel with the first suture.....Group B.
Metacoxal line recurved at end.....Group C.
Metacoxal line forming an entire arc beginning at the inner border of the coxal cavity, varying in the degree of its curve, ending at or near the front angle of the first segment.....Group D.

Group A.

In this group the metacoxal line passes in an oblique curve from the inner edge of the posterior coxal cavity and joins the suture, becoming evanescent. The species are all of small size, the elytra in the majority being ornate with spots or bands. The prosternum is without elevated lines, or at most exhibits very faint traces of them. The metacoxal arc forms a very open curve joining the met-episternal suture near its middle. The abdomen has six distinct segments in both sexes.



The species may be separated as follows:

Elytra piceous, variably ornate.....2.
Elytra yellowish testaceous.....7.
2.—A post basal, slightly oblique yellow band on each elytron....**balteatus.**
Elytra with one or two spots on each.....3.
Elytra narrowly tipped with yellow.....6.
3.—One spot on each elytron, slightly in front of middle....**bigemmeus** ♂.
One spot on each elytron often joined to a large pale apical area.
bigemmeus ♀.
Two spots on each elytron.....4.

4.—Head and thorax yellow, the latter sometimes with piceous basal spot. **Liebecki.**

Head and thorax black.....5

5.—Form oval, elytral spots small and oval.....**myrmidon.**

Slightly oblong, spots somewhat transverse..... **quadritæniatus.**

6. Thorax entirely yellow, elytra very narrowly yellow at tip..**xanthaspis.**

Thorax yellow at sides, elytra with a large yellow spot at apex. **terminatus.** **femoralis.**

7.—Thorax smooth, elytra sparsely punctate.....**debilis.**

The species of this group are from the Atlantic region, except *debilis* from California, but specimens have occurred in Florida which I cannot at present separate from it.

S. balteatus Lec.—Oblong, nearly a half longer than wide, head and thorax reddish, elytra piceous, with a rather broad, slightly oblique yellow band in front of middle, touching the side, but not crossing the suture. Head scarcely visibly punctate. Thorax narrow in front, sides moderately arcuate, surface very sparsely, finely punctate, a fine basal marginal line. Elytra distinctly, not closely punctate; prosternal plate flat, wider in front; meso- and metasternum reddish, the latter scarcely punctate, mesocoxal line joining the suture nearly at its middle. Abdomen piceous, sparsely punctate, with six distinct segments; metacoxal line joining the first suture. Legs yellow. Length .06 inch.; 1.5 mm. Pl. 1, fig. 5.

This species may be at once known by its oblong form and the band-like marking.

Dr. LeConte uses the expression "post-coxal arcs entire," but this is an error of observation caused by a smoother oblique space dividing the meta-coxal plate, and when in certain lights the arc seems complete.

Haulover and Sand Point, Fla.

S. bigemmens n. sp.—Oval, the margin very nearly continuous, head yellow, thorax picco-testaceous, paler at the sides; elytra black, with a small yellow spot on each slightly in front of the middle, apex narrowly pale. Head and thorax scarcely visibly punctate, the latter slightly narrowed in front, sides distinctly arcuate, the basal marginal line scarcely visible. Elytra sparsely and indistinctly punctate; prosternum punctate, not distinctly margined at the sides; metasternum at sides almost smooth, the mesocoxal line joining the suture near the middle. Abdomen yellow, sparsely punctate, metacoxal line joining the suture. Legs yellow. Length .05 inch.; 1.25 mm. Pl. I, fig. 3.

Since the description was written from the unique male in my collection I have seen several females in the collection of Hubbard and Schwarz. These have the thorax entirely yellow, and in addition there is a large yellow area around the apex which is sometimes joined to the discal spot. The sketch of the female (Pl. I, fig. 4) gives on each elytron the variations.

This is one of our smallest species. It is known by the single spot on each elytron a little in front of middle. There are six ventral segments.

Hab.—Florida, Punta Gorda and Biscayne Bay.

S. Liebecki n. sp.—Oval, convex, a slight entering angle at base of thorax, head and thorax yellow, the latter darker in front of scutellum, elytra piceous, a narrow, apical, pale border, a small round yellow spot in front of middle nearer the suture than side, a slightly sinuous transverse band one-third from apex touching the side, but not the suture. Head scarcely punctate. Thorax distinctly punctate, not closely nor coarsely, a fine basal marginal line. Elytra moderately, coarsely and closely punctate; prosternal plate slightly narrowed in front, with feebly indicated, lateral, elevated lines; metasternum closely punctate at the sides, the mesocoxal line joining the suture at a right angle near its middle. Abdomen reddish yellow, punctate; metacoxal line joining the suture and continuous with it. Legs yellow. Length .05—.06 inch.; 1.25—1.5 mm. Pl. I, fig. 6.

The abdomen has six distinct segments. At first glance this species resembles *coloradensis*, but in that species the anterior elytral spot is larger, the posterior differently formed, and the metacoxal line is distant from the suture.

Hab.—Southern New Jersey, collected by Mr. Charles Liebeck, whose name I have pleasure in giving to the species.

Specimens very recently examined from Elkhart, Ind., have a well-marked, thoracic, piceous spot. The posterior elytral spot is also oval and not transverse, the markings thus resembling *myrmidon*.

S. myrmidon Muls.—Oval, black, shining, each elytron with two sharply-defined yellow spots, placed one-third from base and one-third from apex, nearer the suture than the side, apical border very narrowly and indistinctly pale. Head brown, or paler, sparsely finely punctate. Thorax narrower in front, sides moderately arcuate, sparsely finely punctate, a little more closely near the base, a fine basal marginal line. Elytra much more coarsely punctate, not closely but equally. Prosternal plate smooth, triangular; metasternum at sides sparsely punctate, mesocoxal line joining the suture one-third from the front. Abdomen rather sparsely punctate, shining, the metacoxal line joins the first suture and runs coincident with it; femora piceous, tibiæ and tarsi yellow. Length .06—.08 inch.; 1.5—2 mm. Pl. I, fig. 9.

The abdomen is brownish, paler toward apex or yellow, composed of six distinct segments, the first suture less distinct at middle.

Hab.—Pennsylvania, Maryland.

S. quadritæniatus Lec.—Oblong, fully one-third longer than wide, piceous, head and side of thorax yellow, each elytron with two yellow spots, the anterior larger, oblique and oval, the posterior reniform and transverse. Head scarcely punctate. Thorax slightly narrower in front, sides moderately arcuate, surface moderately closely punctate, especially at the sides. Elytra more sparsely

punctate than the thorax; prosternal plate narrower in front with a slight elevated line each side; metasternum sparsely punctured at the sides, the mesocoxal line joining the suture near middle of its length. Abdomen piceous, paler at apex, composed of six segments; metacoxal line joining the first suture. Legs yellow. Length .06 inch.; 1.5 mm. Pl. 1, fig. 1.

Resembles *myrmidon*, but more oblong, less punctate and with sides of thorax yellow.

LeConte notes a variety in which the spots are confluent.

Hab.—Enterprise, Capron and Biscayne, Fla.; Opelousas, La.

S. xanthaspis Muls.—Oval, very little longer than wide, outline of margin nearly continuous, piceous; head, thorax, scutellum and narrow apical elytral border yellow. Head sparsely finely punctate. Thorax narrower at apex, sides feebly arcuate, surface sparsely finely punctate, basal marginal line feeble; punctures of elytra not deep nor closely placed; scutellum often yellow; prosternum much narrowed at middle, punctate, not margined; metasternum piceous, not closely punctate at the sides, mesocoxal line arcuate, joining the suture one-third from the front. Abdomen yellow, punctures fine and not close, metacoxal line joining the first suture. Legs yellow. Length .06—.07 inch.; 1.5—2 mm. nearly.

The abdomen has six segments, the terminal very short. This species resembles *cervicalis*, but is smaller, and has differently formed coxal arcs.

Among the species unknown to LeConte (Proc. Acad. 1852, p. 141) this was placed as a synonym of *ochrodeus*, which is now considered merely a variety of *thoracicus*. The "Catalogus" erroneously places *xanthaspis* as a variety of *terminatus*.

Hab.—Georgia, Florida and Texas.

S. terminatus Say.—Oval, very little longer than wide, margin nearly continuous, piceous; head, margin of thorax and elytral apex yellow. Head sparsely punctate. Thorax distinctly narrower in front, sides moderately arcuate, disc moderately closely punctate, more closely near the sides. Elytra a little more coarsely, but less closely punctured than the thorax; prosternum narrow, an elevated line each side; metasternum closely punctate at the sides, the mesocoxal line joining the suture one-third from the front. Abdomen yellow, piceous at base, the metacoxal line joining the suture and continuous with it. Legs yellow. Length .06—.075 inch.; 1.5—2 mm. nearly. Pl. 1, fig. 15.

The abdomen has six distinct segments. The yellow apical region of the elytra occupies about a fifth or fourth along the suture. The abdomen may be almost entirely yellow, frequently the two basal joints are dark. The pale margin of the thorax varies in extent, and may continue along the apex.

Hab.—Pennsylvania, New Jersey, North Carolina, Georgia, Texas.

S. femoralis Lec.

This species resembles *terminatus* so closely that it may probably be considered a variety. The unique, on which it is founded, has the thorax at sides and in front more narrowly bordered with yellow than in *terminatus*. The abdomen is entirely black, but the color varies considerably in *terminatus*. LeConte seems to have considered the color of the legs important, but I do not find the thighs black as he states, the color seeming to be merely a very dark red, as if discolored by grease.

Hab.—Pennsylvania. Specimen unique.

S. debilis Lec.—Oval, margin slightly interrupted at humeri, about a fourth longer than wide, form not very convex, entirely yellowish testaceous. Head and thorax very sparsely punctate, the latter slightly narrowed in front, sides feebly arcuate. Elytra sparsely, obsoletely punctate; prosternum narrower in front, a slight elevated line each side; metasternum sparsely punctulate, the mesocoxal line arcuate, joining the suture near the apex. Abdomen sparsely punctate, the metacoxal line joining the first suture and continuous with it. Length .04—.05 inch.; 1—1.25 mm.

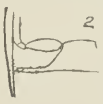
The abdomen has six very distinct ventral segments.

Owing to the fact that the condition of the unique type did not permit a proper examination, this species was placed among those in which the ventral arc is entire.

Hab.—California, San José and Alameda. I have also specimens from Marquette, Mich., and Florida, which I am unable at present to separate from those from California.

Group B.

The metacoxal line passes obliquely toward the first ventral suture and with a gradual or abrupt bend continues parallel with the suture.



The prosternum is convex or flat, with only mere traces of the elevated lines. The mesocoxal arc is rather open and joins the met-episternal suture near the middle. The abdomen has six distinct segments in both sexes.

The species may be arranged in the following manner:

Elytra entirely piceo-testaceous or ferruginous..... **intrusus.**
Elytra piceous, maculate.....2.
2.—Each elytron with one spot.....3.
Each elytron with two spots.....4.
3.—Thorax yellow, elytral spot large and slightly post-median..**bivulnerus.**
Thorax black.
Legs ferruginous, elytral spot one-third from apex and ill-defined. **bisignatus.**
Femora piceous, tibiæ and tarsi yellow, elytral spot well defined, post-median..... **flavifrons.**
Thorax brown, elytral spot large and gradually suffused..... **sordidus.**

4.—Form decidedly elliptical, body beneath black, legs ferruginous. **ornatus.**
Form broadly oval.
Head and thorax yellow, posterior elytral spot somewhat triangular, abdomen black. **coloradensis.**
Head and thorax at sides yellow, posterior elytral spot very irregular, tip pale; abdomen piceous. **amabilis.**
Head black, anterior angles of thorax sometimes yellow, posterior elytral spot transverse, sometimes divided; abdomen black. **guttulatus.**

Of the above species six are from the Atlantic region and three from California.

S. intrusus n. sp.—Oval, very little longer than wide, margin continuous, moderately convex, ferruginous. Head sparsely punctate. Thorax narrower in front, sides feebly arcuate, disc sparsely indistinctly punctate, basal marginal line indistinct. Elytra moderately coarsely, not closely punctate, smoother near apex; margins of prosternum slightly elevated between the coxæ; metasternum closely punctate at the sides, the mesocoxal arc joining the suture one-third from apex. Abdomen punctate at the sides, the metacoxal line parallel with the suture, but not reaching the side margin. Length .06—.07 inch.; 1.5—2 mm. nearly.

The abdomen has six distinct segments. Resembles *debilis*, but is more evenly oval and more convex. The form of the metacoxal line will readily separate the two.

Hab.—Maryland, North Carolina, Texas, Arkansas, Missouri.

S. bivulnerus n. sp.—Regularly oval, sides of thorax and elytra continuous, piceous, head and thorax and a moderately large oval spot slightly post-median on each elytron, yellow. Head and thorax sparsely, finely punctate, a scarcely distinct basal marginal line. Elytra moderately closely punctate; prosternum rather coarsely punctate, without marginal line; metasternum at sides not closely punctate, mesocoxal line arcuate, joining the lateral suture a short distance from the front. Abdomen reddish, moderately densely punctate, metacoxal line parallel with the first suture. Legs yellow. Length .06 inch.: 1.5 mm. Pl. I, fig. 10.

The abdomen has six distinct segments.

Hab.—Florida, Biscayne and Key West (Schwarz).

S. bisignatus n. sp.—Oval, margin slightly interrupted at the base of the thorax, black, moderately shining, each elytron with a transversely oval red spot behind the middle. Head very indistinctly punctate. Thorax slightly narrower in front, sides feebly arcuate, surface very sparsely finely punctate, basal marginal line very fine. Elytra coarsely not closely punctate; prosternal plate broader in front, coarsely punctured, slightly margined at the sides; metasternum coarsely punctured at the sides, the mesocoxal line arcuate joining the suture near the front. Abdomen rather sparsely punctate, the metacoxal line distant from the suture and slightly arcuate, not parallel with the suture. Legs reddish. Length .08 inch.: 2 mm. Pl. I, fig. 11.

This species resembles *bioculatus*, but the reddish elytral spot is larger and less sharply defined. In the form of the metacoxal line

the present species approaches the form seen in the *americanus* group. The abdomen has six distinct segments.

Hab.—Siskiyon County, Cal. (Koebele, 39).

S. flavifrons Mels.—Oval, black, an oval yellow spot on each elytron one-third from apex equally distant from side and suture, head often, tibiæ and tarsi always yellow. Head sparsely punctate. Thorax narrower in front, sides moderately arcuate, surface sparsely punctate, a fine basal marginal line. Elytra more coarsely, but less closely punctate than the thorax. Body beneath black; metasternum nearly smooth at middle, closely punctate at the sides; mesocoxal line joins the episternal suture one-third from the front. Abdomen moderately coarsely and closely punctate; metacoxal line parallel with the first ventral suture. Length .06—.08 inch.; 1.5—2 mm. Pl. I, fig. 7.

Two fairly well marked varieties occur in this species:

S. flavifrons Mels. with a yellow head; subvarieties occur with the thorax entirely black, or with the side margin yellow, sometimes extending along the apex. Specimens occur with only the front angles yellow.

S. bioculatus Muls.—This has a black head and thorax. Mulsant indicates three varieties of this. One is the typical form with the spot of moderate size, the second has a very small spot (*guttiger*) the third has the spot much extended, and in addition has an apical pale border (*marginellus*). This latter is to me doubtfully from our fauna, and seems to be a distinct species.

All the specimens examined seem to be females. The abdomen is very plainly composed of six segments, and the suture between the first and second well marked in its entire extent.

Hab.—Canada, Pennsylvania, New Jersey, Ohio, Illinois, Georgia.

S. sordidus n. sp.—Oval, outline regular, about a fourth longer than wide, normal color piceous, each elytron with a large paler spot, which leaves only a narrow border at sides, base and suture darker, sometimes entirely ferruginous. Head and thorax scarcely punctate, the latter narrower in front, with feebly arcuate sides, the basal marginal line indistinct. Elytra moderately closely punctate; prosternum convex, coarsely punctate, not margined at the sides; metasternum coarsely punctured at the sides, the mesocoxal line arcuate, joining the suture near the middle. Abdomen moderately closely punctate, the metacoxal line not joining the first suture. Legs yellow. Length .06—.08 inch.; 1.5—2 mm. Pl. I, fig. 16.

In color this species varies from ferruginous to piceous, in the latter case the large pale space on the elytra is defined, but not sharply. The abdomen has six segments.

Hab.—California, Los Angeles and Owens Valley.

S. ornatus Lec.—Elliptical, black, dull, each elytron with two obliquely oval and moderately large orange-yellow spots, legs reddish, femora often darker. Head rather sparsely and finely punctured. Thorax narrowed in front, sides feebly arcuate, surface finely, sparsely and equally punctulate, a fine basal marginal line. Elytra more coarsely punctate than the thorax; metasternum coarsely punctured at the sides, the mesocoxal line joining the suture one-third from the coxa. Abdomen coarsely not closely punctate, metacoxal line not touching the first ventral suture and turned slightly forward at its outer end. Length .08—.09 inch.; 2 mm. more and less. Pl. I, fig. 12.

The elytral spots are not very strongly defined. The anterior is oval and oblique, the posterior more transverse, the two spots may touch.

The abdomen in the only specimen before me, a female, is composed of six distinct segments, the first suture distinct in its entire extent.

Hab.—Lake Superior region and Massachusetts.

S. coloradensis n. sp.—Oval, thorax slightly coarctate at base, head and thorax yellow, the latter darker at middle of base, elytra piceous, on each a slightly oblique rhomboidal spot one-third from base, a triangular spot emarginate in front, one-third from apex. Head very sparsely punctate. Thorax scarcely narrowed in front, sides feebly arcuate, surface sparsely punctate, a fine basal marginal line. Elytra much more distinctly punctate, but not closely; prosternal plate rather broad, flat, coarsely punctured; metasternum coarsely punctured at the sides, the mesocoxal line arched joining the suture one-third from the apex. Abdomen piceous, not closely punctate, metacoxal line not joining the suture, but parallel with it. Legs yellow. Length .06 inch.; 1.5 mm. Pl. I, fig. 2.

I have seen but one specimen of this species. The elytral markings resemble some of the varieties of *guttulatus*, but the present species has a yellow head and thorax. There are six distinct ventral segments.

Hab.—Garland, Col. (Schwarz).

S. amabilis Lec.—Oval, not very convex, piceous, or almost black; head, sides and apex of thorax yellow, elytra with an anterior, oblique, irregular fascia, composed of two spots united by a narrow isthmus, apex yellow, curving inward one-third from apex forming a lunule, inside of which is an irregular spot. Head almost smooth. Thorax scarcely narrower in front, sides feebly arcuate, surface finely sparsely punctate, a fine basal marginal line. Elytra moderately coarsely, not closely punctate; prosternal plate parallel, margined at the sides, punctate at middle; metasternum closely punctate at the sides, mesocoxal line joining the suture nearly at middle. Abdomen piceous, paler at sides and apex, composed of six segments, the terminal not prominent; metacoxal plate shorter than the segment, the line curved slightly forward at its outer end. Legs yellow. Length .06—.08 inch.; 1.5—2 mm. Pl. I, fig. 8.

The markings of the elytra are not greatly variable, although at times broadened; they, however, preserve the type above described.

Hab.—Louisiana.

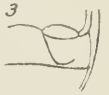
S. guttulatus Lec.—Oval, sides of thorax and elytra nearly continuous black, each elytron with an anterior oblique spot composed of two, which may be joined or separate; at posterior third a transverse band not touching the side or suture, apex indefinitely paler. Head and thorax sparsely and very finely punctate, the thorax with fine basal marginal line; prosternum punctate, without marginal line; metasternum closely punctate at the sides, the mesocoxal line joining the lateral suture one-third from the coxa. Abdomen moderately closely punctate, the metacoxal line curving outwardly not joining the suture, but parallel with it. Legs piceous. Length .06—.08 inch.; 1.5—2 mm. Pl. I, figs. 13, 14.

This species varies in the extent of its elytral markings. The head may be yellow, and also the anterior angles of the thorax. The abdomen has six distinct segments.

Hab.—California, Alameda County, and the vicinity of San Francisco.

Group C.

The metacoxal line in the species of this group passes in an oblique curve toward the first suture and then gradually curves forward, but is not complete. The mesocoxal arc curves forward and joins the suture near the front angle of the metepisternum. The prosternal elevated lines are usually entire and distinct. The abdomen has but five segments, but in some females a sixth is visible. The species are not numerous, and may be thus separated:



Elytra yellowish testaceous.
With numerous small black spots.....**nebulosus.**
Without spots.....**Phelpsii.**
Elytra black, with ante-median obliquely oval red spot.....**circumspectus.**
Elytra black, with large, apical, pale area.....**opaculus.**
Elytra entirely black.
Abdomen more or less yellow, prosternal lines entire.....**americanus.**
Abdomen black, prosternal lines short.....**caurinus.**

S. nebulosus Lec.—Oval, outline nearly continuous, about one-fourth longer than wide, moderately convex, above pale rufo-testaceous, the elytra with small, irregularly placed spots, body beneath black. Head sparsely punctate. Thorax slightly narrower in front, very sparsely finely punctate, basal marginal line nearly obsolete. Elytra moderately coarsely, not closely punctate; prosternum narrowed in front, each side with an elevated line; metasternum closely punctate at the sides, the mesocoxal line forming a nearly complete arc. Abdomen sparsely punctate, the metacoxal line arched, distant from the first suture, incomplete externally. Legs testaceous, femora sometimes darker. Length .07—.09 inch.; 2—2.25 mm.

In the males the fifth ventral is broadly, but slightly emarginate; in the females a sixth segment is very distinctly visible.

In some specimens the disc of the thorax is clouded with piceous.

Hab.—California, Alameda County and Colorado River.

S. Phelpsii Crotch.—Oval, outline nearly continuous, very little longer than wide, moderately convex, rufo-testaceous, underside never entirely black. Head and thorax sparsely punctate, the latter narrower in front, sides feebly arcuate, basal marginal line indistinct. Elytra moderately, not closely punctate, the punctures coarser and finer intermixed; prosternum narrower in front, a fine elevated line each side; metasternum closely punctate at sides, mesocoxal line curved, joining the suture behind the apex. Abdomen less closely punctate, the metacoxal line arcuate close to the suture, incomplete externally. Legs rufo-testaceous. Length .08 inch.; 2 mm.

The mesosternum is always piceous, the abdomen may be piceous, except at apex, or may be entirely pale.

This species resembles *nebulosus*, but the two differ in the metacoxal arc. Here it approaches within a fifth of the length of the segment to the first suture, and in *nebulosus* is one-third from the suture. The abdomen is similarly formed in the two species.

Hab.—British Columbia, Oregon, northern California and Nev.

S. circumspectus n. sp.—Broadly oval, convex, black, each elytron with an oval orange spot, in front of middle, placed slightly obliquely, the outerside truncate. Head moderately closely punctate. Thorax narrowed in front, sides moderately arcuate, disc rather closely not coarsely punctate, basal marginal line distinct. Elytra rather coarsely punctate, closely but not densely; prosternum punctate, with elevated, convergent lines; metasternum closely punctate at the sides, mesocoxal line arcuate, joining the suture near the front. Abdomen closely punctate, metacoxal line arcuate, not reaching the suture, incomplete externally; femora piceous, tibiæ and tarsi yellow. Length .10 inch.; 2.5 mm. Pl. 11, fig. 4.

The abdomen has five segments. This species is easily known, being the only one in our fauna with the incomplete, but arcuate metacoxal line having an elytral spot.

Hab.—Lookout Mountain, Tenn., Louisiana (Ulke).

S. opaculus n. sp.—Oval, convex, very little longer than wide, margin continuous, piceous, head and sides of thorax broadly yellow, elytra with an apical pale space occupying a fourth, the anterior edge on each side convex in front. Head sparsely punctate. Thorax narrower in front, sides arcuate, disc sparsely finely punctate, basal marginal line indistinct. Elytra moderately closely and more coarsely punctate than the thorax; prosternum punctate, the lateral elevated lines indistinct; metasternum coarsely and closely punctate at the sides, the mesocoxal line joining the suture a little in front of the middle. Abdomen yellow at sides and apex, composed of five segments, closely punctate, the metacoxal line touches the suture and curves feebly forward. Legs yellow. Length .10 inch.; 2.5 mm.

This species has considerable superficial resemblance to *Brullei*, but is darker, differing especially in the form of the metacoxal line, which is a complete arc in *Brullei*. There is a distinct epipleural fovea for the reception of the knee of the middle leg.

One specimen, Colorado.

S. americanus Muls.—Broadly oval, convex, color variable, thorax usually orange with a central piceous space, elytra narrowly tipped with red. Head and thorax sparsely punctate, the latter narrowed in front with feebly arcuate sides, basal marginal line distinct. Elytra coarsely and moderately closely punctate; prosternum with convergent elevated lines, which are variable in distinctness; metasternum rather coarsely and closely punctate at the sides, the mesocoxal line arched, joining the suture near the front. Abdomen more or less yellow, moderately closely punctate, the metacoxal line arcuate, approaching very close to the first suture. Legs usually yellow, but varying to black. Length .08—.12 inch.; 2—2.5 mm.

The abdomen has but five segments, the last two of the male feebly broadly emarginate. Usually the head is yellow, specimens are not rare black. The thorax may be almost entirely yellow, usually with a median piceous space; sometimes the angles only are yellow, while several specimens before me are entirely black. The abdomen is usually yellow, piceous at middle and base, but the entire color may be black. The legs vary from yellow to black.

Hab.—New York southward to Florida and Texas, westward to Illinois.

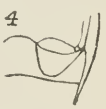
S. caurinus n. sp.—Broadly oval, convex, outline continuous, entirely piceous, sometimes with the head and sides of thorax yellow. Head sparsely punctate. Thorax narrower in front, sides feebly arcuate, very finely sparsely punctate, basal marginal line not visible. Elytra moderately coarsely, not closely punctate, the lateral elevated lines short; metasternum at sides closely, roughly punctate, the mesocoxal line joining the suture one-third from the front. Abdomen black, with five segments, closely punctate, the metacoxal line very nearly touching the suture, curving to front and evanescent. Legs red. Length .08—.10 inch.; 2—2.5 mm.

This species varies from entirely piceous to those having the head and a variable extent of the sides of the thorax reddish yellow. The entirely black forms resemble *tenebrosus*, but differ in the form of the metacoxal arc.

Hab.—Washington, Oregon (Koebele) and Cal. (Owens Valley).

Group D.

The metacoxal line in this series forms a complete arc beginning at the inner edge of the posterior coxal cavity, sometimes touching at the apex of the curve the first suture, ending nearly at the anterior angle of the segment. The prosternal lines are well marked and entire in all the species, usually convergent to the front. The mesocoxal arc joins the met-episternal suture near the front angle. The abdomen has five segments, but rarely specimens show the sixth.



The species of this group nearly equal in number those of all the preceding groups together, and present the greatest difficulty in their separation. The greater number of the species had been described from very limited material, and the characters made use of are now seen with more specimens and species to have very little value. On the other hand it has never been found necessary to use the secondary sexual characters for the first time.

The following table will assist in the separation of the species:

Form broadly oval, outline at humeri continuous.....2.
Form oblong, thorax narrower at base than the base of elytra ..... 12.
2.—Entirely testaceous above.....**pallens.**
Elytra in great part yellow, with merely an elongate-triangular sutural area black.....**cinctus.**
Elytra black, with discal defined spot.....3
Elytra pale at apex, either merely bordered with yellow, or with an apical area of that color.....4
Elytra entirely black.....7.
3.—Elytral spot antemedian, nearly oval, anterior angles of thorax yellow. **pacificus.**
Elytral spot very oblique, thorax black.....**strabus.**
Elytral spot post-median, thorax yellow at sides. .....**flebilis.**
4.—Elytral pale apex wide, or even large .....5.
Elytra narrowly pale at apex.....6
5.—Thorax with median black spot.
Apical spot not larger than a fifth the length of the suture..**fraternus.**
Apical spot fully a third of superficial area.....**Brullei.**
Thorax entirely yellow.
Apical area large.....**semiruber.**
6.—Thorax partly black.
First ventral of male with a median smooth area surrounded by short pubescence.....**puncticollis.**
First ventral of male without pubescence .....**collaris.**
Thorax entirely yellow.....**cervicalis.**
7.—Species larger .08—.10 inch.....8.
Species small .06 inch.....11.
8.—Metacoxal arc much shorter than first segment.....**abbreviatus.**
Metacoxal arc nearly as long as the segment.....9
9.—First ventral of male with a tubercle at middle of posterior edge, finely pubescent.....**marginicollis.**
First ventral male not tuberculate.....10
10.—Last segment of male feebly impresso-emarginate.
Sides of thorax more or less yellow.....**ardelio.**
Thorax entirely black.....**tenebrosus.**
Last segment of males deeply impresso-emarginate.....**lacustris**
11.—Metacoxal arc scarcely as long as half the segment.....**punctum.**
Metacoxal arc nearly as long as the segment.
Thorax distinctly punctate; pubescence recumbent.....**nanus.**
Thorax smooth; pubescence erect.....**utilis.**

12.—Elytra relatively coarsely punctured, black with a spot of variable size nearly central on each elytron, rarely absent ..... **punctatus.**

Elytra very indistinctly punctate, almost entirely reddish yellow, base and suture alone dark ..... **coniferarum.**

S. pallens Lec.—Rather broadly oval, margin slightly interrupted, convex, rufo-testaceous above, beneath black, except the last three segments of abdomen, legs pale. Head very sparsely punctate. Thorax narrower in front, sides arcuate, surface finely evenly punctate, basal marginal line distinct. Elytra moderately, finely and not deeply punctate; prosternum punctate, the elevated lines short, posterior; metasternum at sides coarsely, closely punctate, mesocoxal line arcuate, joining the suture near the front. Abdomen coarsely and closely punctate, the metacoxal line forming a complete arc very nearly as long as the first segment. Length .06—.08 inch.; 1.5—2 mm.

The abdomen has five segments only. This species resembles *Phelpsii*, which, however, has an incomplete metacoxal arc. The first two ventral segments and the middle of the third are black, the rest of the abdomen yellow.

Hab.—California, San Francisco, Alameda, Los Angeles, Yuma. American Fork Canon, Utah, Pinal Mountains, Ariz.

S. cinctus Lec.—Broadly oval, convex, outline continuous, beneath piceous, above in great part reddish yellow, the thorax with a basal piceous spot, which continues on the elytra gradually narrowing, reaching more than three-fourths the length of the suture. Head not densely punctate. Thorax narrower in front, sides feebly arcuate, basal marginal line distinct, surface finely and equally punctate. Elytra much more coarsely and deeply punctured than the thorax; prosternum punctate, the elevated lines convergent to the front; metasternum at sides coarsely and closely punctate, the mesocoxal line arcuate, joining the suture near the front. Abdomen closely punctate, the metacoxal line entire not quite reaching the margin of the segment, the outer end reaching the anterior angle of the segment; femora piceous, tibiæ and tarsi paler. Length .08 inch. slightly more or less; 2 mm. Pl. II, fig. 5.

Under the above name *suturalis* || Lec. (*LeConteï* Cr.) is included. These two species were described from uniques, and the slight differences indicated vanish in a small series. As a rule, however, the California specimens are somewhat more densely punctured, but not less coarsely as stated by LeConte.

In nearly all the specimens examined there is a short, narrow, piceous space at the side margin of the elytra slightly behind the middle. Thirteen specimens examined.

The species is very close to *Loewii* and *floralis*, and the differences noted by LeConte are as to the first of the most evanescent character, and as to the second refer rather to a variety mentioned by Mulsant.

Hab.—New Orleans, Texas, westward to California, Yuma to Los Angeles.

S. pacificus Cr.—Oval, outline nearly continuous, black shining, each elytron with a large reddish yellow oval spot slightly in front of middle, anterior angle of thorax yellow. Head sparsely punctate, color either yellow or piceous. Thorax slightly narrowed in front, sides feebly arcuate, sparsely finely punctate, basal marginal line distinct. Elytra moderately coarsely, not closely punctate; prosternum smooth at middle, the elevated lines parallel and entire; metasternum roughly punctured at the sides, the mesocoxal line arcuate, joining the suture one-third from the front. Abdomen moderately, coarsely and closely punctate, the metacoxal line forming a complete arc as long as the first segment; femora piceous, knees, tibiæ and tarsi rufo-testaceous. Length .08—.10 inch.; 2—2.5 mm. Pl. II, fig. 7.

There does not appear to be any variation in the coloration of the specimens examined, except as to the head, which may be either yellow or black, independently of sex. The color of the anterior angles of the thorax is not sexual, as Crotch's description would seem to indicate.

Hab.—California, Calaveras to Los Angeles.

S. strabus n. sp.—Oval, convex, outline continuous, black, shining, each elytron with an oblique red spot, nearly all of which is in front of middle. Head sparsely punctate. Thorax slightly narrower in front, sides feebly arcuate, basal marginal line distinct, surface finely not closely punctate. Elytra sparsely, indistinctly punctate; prosternal elevated lines not reaching the anterior margin of sternum; metasternum at sides coarsely, closely punctured, the mesocoxal line arched, joining the suture one-third from apex. Abdomen closely punctate, the metacoxal line forming a complete arc, as long as the segment, the enclosed space smooth. Legs piceous, tibiæ and tarsi somewhat paler. Length .10 inch.; 2.5 mm. Pl. II, fig. 6.

Of this species but one female specimen has been examined. It resembles *pacificus*, but is more convex and broader, the red spot is oblique, the thorax entirely black.

Hab.—New Mexico.

S. flebilis n. sp.—Regularly oval, black, head and sides of thorax broadly reddish yellow, each elytron with a reddish yellow triangular spot near the apex. Head sparsely punctate. Thorax narrowed in front, sides feebly arcuate, sides broadly reddish yellow, this extending narrowly along the apex, surface very sparsely punctate, the basal marginal line indistinct. Elytra moderately coarsely, not closely punctate; prosternal lines parallel and entire; metasternum coarsely punctate at sides, the mesocoxal line arcuate, joining the suture one-fourth from the front. Abdomen black, closely punctate, the metacoxal line forming a complete arc a little shorter than the segment. Legs piceous. Length .08 inch.; 2 mm.

The elytra are paler along the apical border, but without forming the red edge characteristic of the forms allied to *collaris*. To this latter species it has considerable resemblance apart from the moderately large reddish spot near the apex of the elytra, which may be called triangular with rounded angles.

Hab.—Arizona, Gila Bend (Wickham).

S. fraternus Lec.—Broadly oval. Head yellowish, sparsely punctate. Thorax narrowed in front, sides moderately arcuate, surface sparsely, obsoletely punctate, color yellow, with a piceous median area of variable extent. Elytra black, not very closely nor densely punctate, the apex with a yellowish area, which never extends along the suture more than a fifth of its length, but along the apex and sides nearly a third of the curve; prosternal lines distinct, convergent in front; metasternum coarsely punctate the mesocoxal line arcuate, joining the suture near the front. Abdomen piceous, gradually paler at sides and apex, metacoxal arc entire not quite as long as the segment. Legs reddish yellow. Length .08 inch.; 2 mm. Pl. II, fig. 3.

The only variation observed is that of color. The piceous area of the thorax may be greater or less, but the yellow lateral border is always wide. The apical pale area of the elytra does not vary to any extent. The abdomen may have the sides and apex vaguely paler, or the paler area may be well defined.

As a synonym of this species *hæmorrhous* Lec. is placed. A recent examination of the types of both shows that they were established on uniques, the differences being merely individual, *fraternus* having the greater extent of yellow on the thorax. Specimens supposed to be the males of this species are less broadly oval, and the yellow at apex of greater extent.

S. creperus Muls. seems to differ only in having the last three ventral segments very yellow, except a median piceous spot on the third segment. Mulsant records a variety of this which he calls *astutus*. While I am not yet fully prepared to place all the above in synonymy, it needs but a few intermediate forms to do so. In that case the name *creperus* must stand. By some accident the latter escaped notice by LeConte.

Hab.—Canada, Middle States, Illinois, Louisiana, Texas.

S. Brullei Muls.—Oval, black, sides of thorax and a large apical elytral space reddish yellow. Head sparsely punctate, color piceous or yellow. Thorax narrowed in front, sides arcuate, surface sparsely, indistinctly punctate, color variable from being entirely black to having the sides broadly and apex narrowly yellow. Elytra moderately closely and distinctly punctate, black, the apical yellow space occupying a third or even more of the superficial area; prosternal lines distinct, convergent to the front; metasternum closely punctate at the sides, mesocoxal arc joining the suture near the front. Abdomen usually entirely piceous, closely punctate, metacoxal arc entire fully three-fourths the length of the segment. Legs testaceous or slightly rufous, the femora darker. Length .08—.10 inch.; 2—2.5 mm. Pl. II, fig. 8.

The description applies to many specimens seen from Florida, Texas and Wyoming. I have two others which differ (Missouri and New York) in having the sides and apex of the abdomen broadly

yellow. The variation in color of the thorax has been indicated, that at the apex of elytra is variable in extent, rarely smaller than shown in the figure, but sometimes much larger.

A specimen in my cabinet from Texas has the elytra much more coarsely punctate than usual, the thoracic piceous area small, the sides and apex of abdomen yellow. This may indicate a distinct species, but with a unique and the recognized variation observed in other species it does not seem safe to separate it under a distinct name.

Hab.—Florida, Texas, Wyoming, Kansas and perhaps New York and Missouri.

S. semiruber n. sp.—Oval, outline regular, convex, head and thorax reddish yellow, elytra piceous, the apical third or nearly half reddish yellow, beneath piceous, abdomen almost entirely and legs yellow. Head moderately punctate. Thorax narrower in front, sides feebly arcuate, basal marginal line distinct, surface sparsely, indistinctly punctate. Elytra moderately coarsely, closely, not densely punctate; prosternum in great part yellow, the elevated lines entire and convergent; metasternum at sides coarsely and closely punctate, the mesocoxal line joining the suture one-third from the front. Abdomen closely punctate, the metacoxal arc entire, not quite reaching the first suture, the enclosed area smooth. Length .08 inch. nearly; 2 mm.

This species resembles *collaris*, but differs in the much greater extent of the red elytral apex and by the almost entirely reddish yellow abdomen. The extent of the red elytral apex is as great, or even greater than observed in *Brullei* (*hæmorrhous* Lec.).

Hab.—Florida, Texas.

S. puncticollis Lec.—Oval, black, rather dull, sides of thorax indefinitely yellow, apex of elytra narrowly reddish. Head piceous, mouth paler, surface finely punctate. Thorax narrowed in front, sides feebly arcuate, basal marginal line distinct, surface evidently punctate, more closely toward the sides. Elytra more coarsely punctured than the thorax and moderately closely; prothorax beneath piceous, prosternal lines entire and nearly parallel; metathorax at sides coarsely not densely punctate, mesocoxal line joining the lateral suture near the front. Abdomen closely punctate, the metacoxal arc entire very nearly as long as the segment; tibiæ and tarsi pale, femora more or less piceous. Length .08—.10 inch.; 2—2.5 mm.

The fifth ventral is broadly and deeply emarginate. The first ventral has a smooth median area limited each side by a narrow space of fine, short pubescence.

The last two or three segments are usually paler, sometimes also this color extends indistinctly on the sides of the other segments.

This species is allied by general characters to *collaris*. The head has never been observed to be yellow, nor are the sides of the thorax

as broadly so. The legs, when mature, differ in color in the two species, but immaturity in the present species would render this an indefinite character. The character shown by the first ventral segment of the male is a positive means of separation.

Hab.—Canada, New York and New Jersey (Da Costa, Wenzel), Upper Mississippi (LeConte).

S. collaris Mels.—Regularly oval, piceous, moderately shining, head and thorax reddish yellow, the latter with a piceous medio-basal area of variable extent, apex of elytra narrowly pale. Head sparsely finely punctate. Thorax narrower in front, sides feebly arcuate, surface sparsely punctate, more distinctly at middle than at sides, basal marginal line feebly distinct. Elytra punctate, the punctures not coarse nor close; prothorax beneath yellow, the prosternal lines entire, convergent in front; metasternum at sides coarsely and closely punctate, the mesocoxal line joining the lateral suture one-fourth from the front. Abdomen closely punctate, piceous, the last three segments usually yellowish, metacoxal line forming a complete arc, very nearly as long as the segment. Legs entirely reddish yellow. Length .08—.09 inch.; 2—2.25 mm. Pl. II, fig. 1.

The male has the fifth ventral broadly and deeply emarginate, the first ventral at middle finely and closely punctate, without pubescence.

The color of the thorax varies; the piceous area may be merely a small space in front of the scutellum, or it may occupy a full third of the surface. The abdomen may vary in color, so that even the sides of the first two segments may be pale. The legs seem uniformly reddish yellow.

Under the name *collaris* are included several described by Mulsant and LeConte, evidently from inadequate material; these are *chatchas* and *fastigiatus* Muls. and *caudalis*, *consobrinus* and *socer* Lec.

Closely allied also is *puncticollis* Lec., which may be separated empirically by the color of the legs, and certainly by the male characters.

Hab.—Canada, southward to Florida and Texas, westward to Illinois and Nebraska.

S. cervicalis Muls.—Oval, outline continuous, convex, head, thorax and legs reddish testaceous, elytra piceous, at apex narrowly bordered with reddish yellow. Head sparsely punctate. Thorax narrower in front, sides arcuate, surface very sparsely punctate, basal marginal line distinct. Elytra moderately coarsely, but not closely punctate; prosternum more or less yellow, the elevated lines slightly convergent to the front; metasternum at sides moderately closely punctured, the mesocoxal line joining the suture one-third from apex. Abdomen black, the terminal segments pale, metacoxal line forming a complete arc shorter than the segment. Length .06—.09 inch.; 1.5—2.25 mm.

The prosternal lines vary in length, being at times short not passing the coxæ, or they may attain the front of the prosternum. The

abdomen may be narrowly pale at apex, or the greater part of the last three segments pale. The apical pale border of the elytra is at times indistinct, in its best development it never exceeds an eighth of the length of the suture.

From an examination of the type of *socer* it seems to be an accidental *cervicalis*, with the middle third of the base of the thorax piceous.

Hab.—Canada, New Jersey, North Carolina, Georgia, Missouri.

S. abbreviatus Lec.—Oval, very little longer than broad, entirely black, legs red. Head moderately, coarsely and closely punctate. Thorax narrower in front, sides very little arcuate, basal marginal line distinct, but fine; surface sparsely punctate at middle, much more closely at the sides. Elytra coarsely and moderately closely punctate; prosternal elevated lines distinct, slightly convergent in front; metasternum closely punctate at sides, the mesocoxal arc joining the suture one-fourth from the front angle. Abdomen more finely, but densely punctate, metacoxal arc entire very little longer than half the first segment. Length .08 inch.; 2 mm.

This species resembles *tenebrosus*, but the upper surface is more coarsely and closely punctate. They differ more especially in the extent of the metacoxal arc, which here is short, but in *tenebrosus* nearly as long as the segment.

Hab.—Lake Superior region. Two females in the LeConte cabinet.

S. marginicollis Mann.—Broadly oval, outline continuous, black, head often (especially in male) and sides of thorax reddish yellow. Head finely, sparsely punctate. Thorax slightly narrowed in front, sides feebly arcuate, surface punctate, more closely at sides, basal marginal line distinct. Elytra moderately closely punctate; prosternal carinæ convergent and entire; metasternum coarsely and closely punctate, the mesocoxal line arcuate, joining the suture near the front angle. Abdomen closely coarsely punctate, the metacoxal arc entire very nearly as long as the first segment. Legs nearly black, the anterior sometimes more or less rufous. Length .06—.08 inch.; 1.5—2 mm.

The male has the fifth ventral feebly emarginate as usual in the genus. At the middle of the posterior margin of the first ventral segment is a small tubercle with very small hairs.

This species varies in the coloration of the head and thorax. The head may be either red or black, in the former case nearly all are males, although some females are similarly colored. The thorax is usually yellow at the sides in a variable extent, sometimes the median dark space is reduced to a narrow strip along the middle of the base. Others again have the entire thorax black. These are not readily separable from *lacustris* by description, except in the male.

Under the name *marginicollis* there have hitherto been placed all the California *Scymnus* with black elytra and pale thoracic sides. My attention was first called to the peculiar structure of the first ventral segment of the male by Mr. H. C. Fall, of Pomona, Cal., and it is plainly evident that two species at least have been confounded. I know of no means of separating the females excepting that in the present species the legs are nearly always black, while in the other they are either red or the tibiæ and tarsi are pale.

I have chosen the name *marginicollis* for the above form rather arbitrarily from the fact that it is inferrible from the descriptions that the legs are almost entirely black.

Hab. California, extending from a little north of San Francisco to Santa Barbara, Los Angeles; Catalina Isd., San Diego and Pomona.

S. ardelio n. sp.

This name is given to those forms heretofore mixed with *marginicollis*, and to which the detailed description of that will fully apply, except as to the following details:

The legs may be reddish yellow, or the tibiæ and tarsi alone of that color; sometimes the legs are entirely piceo-rufous.

The male has the fifth segment feebly emarginate, the first segment at middle not tuberculate, but with an oval polished space at the suture sharply limited by the close punctures around it.

The variations are as in *marginicollis*, but specimens entirely black are more numerous, and that, too, among those with the palest legs.

It is possible that there remain two species in the above aggregate, but I am unable to separate them, but those forms with the entirely rufo-testaceous legs are to be considered the typical forms.

There is still greater difficulty in separating the species from *lacustris* and *tenebrosus* than in the case of *marginicollis*. In the latter the male has the small tubercle of the first ventral segment. In the present species the first ventral does not greatly differ from the other two mentioned. In both these, however, the last segment of the male is much more deeply emarginate, especially in *lacustris*.

Hab.—British Columbia southward through Washington, Oregon and California, eastward to Utah. Specimens have been seen from Arizona, El Paso, Tex., and Calumalli Mines, Penins. Cal.

S. lacustris Lec.—Broadly oval, convex, black. Head sparsely punctate. Thorax narrowed in front, sides feebly arcuate, surface sparsely feebly punctate. Elytra moderately, coarsely, but not closely punctate; prosternal carinæ distinct.

convergent in front; metasternum at sides very coarsely punctate, the mesocoxal line joining the lateral suture one-third from the front. Abdomen black, evenly and more finely punctate than the metasternum; metacoxal are entire, the enclosed area nearly as long as the segment; femora entirely or in great part piceous, tibiæ and tarsi paler. Length .08—.10 inch.; 2—2.5 mm.

In the male the last ventral segment is very deeply impresso-emarginate. The legs may be entirely piceous.

Hab.—North shore of Lake Superior (Lec.); westward Utah, Park City, Nev., Washington, California.

S. tenebrosus Mals.—Broadly oval, entirely black, legs red or reddish brown. Head sparsely punctate. Thorax narrower in front, sides feebly arcuate, surface equally sparsely punctate. Elytra slightly more closely and coarsely punctured than the thorax. Body beneath entirely black; prosternal elevated lines entire, slightly convergent; metasternum at sides coarsely and closely punctate, the mesocoxal arc joining the lateral suture very near the front angle. Abdomen more closely, but less coarsely punctured than the metasternum, metacoxal arc entire, nearly as long as the first segment. Length .08—.10 inch.; 2—2.5 mm.

In the male the last ventral is feebly impresso-emarginate. The legs vary in color from very pale red to brown, but are uniform. In the original description LeConte states that the head of the male is pale. This is only partly true; the color of the head is by no means indicative of sex.

Hab.—Massachusetts to North Carolina, Southern States (Lec.).

S. punctum Lec.—Broadly oval, black, shining, outline nearly continuous, legs testaceous, the femora more or less piceous or even black. Head indistinctly punctate. Thorax narrowed in front, sides feebly arcuate, surface sparsely punctate at middle, more densely and coarsely at the sides, the basal marginal line distinct. Elytra sparsely punctate, the punctures finer than those of the sides of the thorax; prosternum slightly convex and punctate, without elevated lines; metasternum at sides coarsely punctate, the mesocoxal line arcuate, joining the suture one-fourth from the front. Abdomen rather densely punctate, metacoxal line forming a complete arc scarcely longer than half the first segment. Length .05—.06 inch.; 1.25—1.50 mm.

In the male the fifth ventral segment is slightly emarginate, the female has six very distinct segments. The suture between the first two ventral segments is totally obliterated at middle.

The color of the legs varies; the tibiæ and tarsi are testaceous and the femora piceous, but the femora may be almost entirely pale, except at base, or may be entirely black.

Hab.—The species seems very widely distributed, specimens are known to me from Canada, the Middle States, Missouri, New Mexico, British Columbia, and California from Siskiyou to Los Angeles.

S. nanus Lec.—Broadly oval, outline continuous, black, shining, anterior angles of thorax often rufescent, legs reddish. Head evidently punctate. Thorax narrower in front, sides arcuate, surface sparsely punctate, equally at middle and sides, basal marginal line distinct. Elytra not closely punctate, but much more coarsely than the thorax; prosternum slightly convex, punctate, without elevated lines; metasternum at sides closely punctate, the mesocoxal line joining the suture one-fourth from apex. Abdomen closely punctate, the metacoxal line forming a complete arc nearly as long as the first segment. Length .05—.06 inch.; 1.25—1.50 mm.

As in *punctum* the male has the fifth ventral feebly impressed at tip, the female has six distinct segments, the suture between the first two ventrals is not so completely obliterated as in that species.

The thorax may have the apical angles reddish, but never very conspicuously so, but the thorax may be entirely black. This species resembles *punctum* closely, and the only reliable character for their separation is in the form of the metacoxal line, here the arc is very nearly as long as the first segment, in that but little more than half. The punctuation of the sides of the thorax—coarse in *punctum*, very fine and sparse in *nanus*, is a fairly good character, but variable to an extent leading to doubt.

Hab.—Specimens have been seen from Michigan, Middle States, Florida, New Mexico, Arizona and California.

S. utilis n. sp.—Broadly oval, convex, piceous black, shining, mouth parts, antennæ and legs yellow, pubescence sparse, erect. Head indistinctly punctate. Thorax much narrower in front, sides feebly arcuate, basal marginal line distinct, surface almost smooth, a few fine, indistinct punctures. Elytra relatively coarsely, sparsely, but not deeply punctate, each puncture with a nearly erect grayish hair; prosternum flat, without elevated lines; metasternum smooth, slightly punctate at sides, mesocoxal arc short, joining the suture near the front angle. Abdomen with six distinct segments, sparsely punctate, the metacoxal arc entire, nearly as long as the segment. Length .03—.04 inch.; 1 mm. and less.

This species resembles some of the smaller forms of *nanus* and *punctum*, but may be known from these as well as any others in our fauna by the nearly erect, sparse hairs of the surface.

Hab.—Florida, Tampa, Bartow, Crescent City and Hanlover (coll. Hubbard and Schwarz). A specimen in bad condition in my collection from Albuquerque, N. Mex., probably belongs here. This *Scymnus* is predatory on *Aleyrodes citri*.

S. punctatus Mels.—Oblong oval, more than half longer than wide, black, shining, each elytron with a small, oval, red spot near the centre. Head sparsely punctate. Thorax slightly narrower than the elytra, narrowed in front, sides nearly straight, arcuate near front angles, disc distinctly punctate, the punctures evenly disposed, basal marginal line distinct. Elytra a little wider at base than

the thorax, coarsely and moderately deeply, but not closely punctate; prosternum without elevated lines; metasternum sparsely punctate at the sides, the mesocoxal line feebly curved, joining the suture one-third from the front. Abdomen sparsely punctate, the metacoxal line forming a complete arc very little broader than long and nearly as long as the segment. Legs black or piceous. Length .06 inch.; 1.5 mm. Pl. II, fig. 2.

In the male the last ventral is feebly emarginate at tip. This species varies a little in the size of the red elytral spot. In one specimen before me from Texas the spot extends obliquely to the suture. The absence of the prosternal elevated lines seems to relate this species to the forms with the incomplete metacoxal arc.

I have in my cabinet one specimen in which the elytra are entirely black without spot. Its other characters are those of *punctatus*. I feel unwilling to separate it as a distinct species, inasmuch as the Canadian specimens show quite a variation in the size of the elytral spot. The specimen is from Eagle Harbor, Lake Superior.

Hab.—Canada, Pennsylvania and Texas.

S. coniferarum Crotch.—Oblong oval, fully one-half longer than wide, black, anterior angles of thorax pale, elytra reddish, black along the base and two-thirds of the suture and sides. Head sparsely punctate. Thorax slightly narrowed in front, sides very feebly arcuate, surface sparsely indistinctly punctate. Elytra a little wider at the base than the thorax, sparsely punctate; prosternal elevated lines well marked, parallel and entire; metasternum sparsely punctate at sides, the mesocoxal line feebly arched joining the suture one-fourth from the front. Abdomen sparsely punctate, metacoxal line forming a complete arc, two-thirds the length of the segment. Legs black. Length .06—.08 inch.; 1.5—2 mm.

The only variation observed is in the extent of the red coloration of the elytra. Sometimes they are entirely red, or the base and two-thirds of suture and side margin piceous, or the piceous may extend to the apex along the suture and side thus enclosing a large oval discal spot. A specimen from Veta Pass, Col. (Schwarz), has the thorax entirely black and the legs reddish. This may be a distinct species, but the material at hand is not sufficient to establish it.

Hab.—California from Tahoe and Alameda south to San Bernardino, Nevada, Colorado, Veta Pass.

Synonymy and Bibliography.

SCYMNUS Kug.

S. balteatus Lec., Proc. Am. Philos. Soc. 1878, p. 399.
S. bigemmeus n. sp.
S. Liebecki n. sp.
S. myrmidon Muls., Spec. Sec. p. 954.

S. quadritæniatus Lec., loc. cit. p. 400.
S. xanthaspis Muls., loc. cit. p. 952.
S. terminatus Say, Bost. Jour. i, p. 203; edit. Lec. ii, p. 671; Muls., loc. cit. p. 952; Lec., Proc. Acad. 1852, p. 136.
S. femoralis Lec., loc. cit. p. 136.
S. debilis Lec., loc. cit. p. 137.
S. intrusus n. sp.
S. bivulnerus n. sp.
S. bisignatus n. sp.
S. flavifrons Mels., Proc. Acad. 1847, p. 181; Lec., loc. cit. p. 136; *bioculatus* Muls., loc. cit. p. 960; Lec., loc. cit. p. 136; *guttiger* et *marginellus* vars. Muls., loc. cit. p. 965.
S. sordidus n. sp.
S. ornatus Lec., loc. cit. p. 135.
S. coloradensis n. sp.
S. amabilis Lec., loc. cit. p. 135.
S. guttulatus Lec., loc. cit. p. 136.
S. nebulosus Lec., loc. cit. p. 137.
S. Phelpsii Crotch, Trans. Am. Ent. Soc. 1874, p. 77.
S. circumspectus n. sp.
S. opaculus n. sp.
S. americanus Muls., loc. cit. p. 965; Lec., loc. cit. p. 137.
S. caurinus n. sp.
S. pallens Lec., loc. cit. p. 137.
S. cinctus Lec., loc. cit. p. 137; *suturalis* || Lec., loc. cit. p. 138; *LeConteï* Crotch, Revision, p. 264.
S. pacificus Crotch, Trans. Am. Ent. Soc. 1874, p. 77.
S. strabus n. sp.
S. flebilis n. sp.
S. fraternus Lec., loc. cit. p. 138; *? crepcrus* Muls., loc. cit. p. 985; *astutus* Muls., loc. cit. p. 986; *hæmorrhous* Lec., loc. cit. p. 138.
S. Brullei Muls., loc. cit. p. 984.
S. semiruber n. sp.
S. puncticollis Lec., loc. cit. p. 139.
S. collaris Mels., Proc. Acad. 1847, p. 180; *chatchas* Muls., loc. cit. p. 986; *fastigiatus* Muls., loc. cit.; *caudalis* Lec., *consobrinus* Lec., loc. cit. p. 139.
S. cervicalis Muls., loc. cit. p. 984; Lec., loc. cit. p. 139; var. *? socer* Lec., l. c.
S. abbreviatus Lec., loc. cit. p. 140.
S. marginicollis Mann., Bull. Mosc. 1843, p. 313; Muls., loc. cit. p. 1053; Lec., loc. cit. p. 140.
S. ardelio n. sp.
S. lacustris Lec., loc. cit. p. 140.
S. tenebrosus Muls., loc. cit. p. 989; Lec., loc. cit. p. 140.
S. punctum Lec., loc. cit. p. 141.
S. nanus Lec., loc. cit. p. 140.
S. utilis n. sp.
S. punctatus Mels., Proc., Acad. 1847, p. 180.
S. coniferarum Crotch, Trans. Am. Ent. Soc. 1874, p. 77.

Not Identified.

S. icteratus Muls., loc. cit. p. 969.
S. cyanescens Muls., loc. cit. p. 993.
S. atramentarius Boh., Eug. Resa Ins. p. 207.
S. californicus Boh., loc. cit.
S. infuscatus Boh., loc. cit. p. 208.

ERRATUM—Page 85, line 13, for *caurinus* read *opaculus*.

SCYMNILLUS n. g.

This genus is proposed for a species of the form and habitus of *Scymnus punctum*, with all the essential characters of *Scymnus*, but differing in the following particulars:

Body not pubescent, except feebly on the head and thorax. Eyes feebly emarginate and impressed, the lenses obliterated opposite the base of the antennæ. Antennæ very short, formed as in *Scymnus*; prosternum flat, elevated lines not distinct; mesocoxal line joining the met-episternal suture at middle. Abdomen composed of five segments, the first longer at middle than the next three, the suture between the first and second well marked; metacoxal line oblique, extended toward the edge of the segment, which it joins near the posterior angle.

The impression of the eyes recalls a similar character observed in *Throscus*, in which, however, the impression is better marked. My attention was first especially directed to this insect by the fact that there are but five ventral segments, while in the group (B) of *Scymnus*, with which it might be associated, there are six segments. The metacoxal line is also more oblique than in that group, and reaches the side of the segment without running parallel with the first suture.

S. aterrimus n. sp.—Broadly oval and convex, margin slightly interrupted, black, shining, elytra usually without trace of pubescence. Head coarsely sparsely punctate. Thorax slightly narrowed in front, sides feebly arcuate, surface coarsely not closely punctate, basal marginal line indistinct; prosternum flat, coarsely punctured, without elevated lines; metasternum coarsely sparsely punctured and alutaceous, the mesocoxal line joining the suture near its middle. Abdomen sparsely punctate, metacoxal line feebly curved, not touching the first suture nor parallel with it. Length .04—.06 inch.; 1—1.5 mm.

The abdomen has but five segments; the pubescence of the head and thorax is sparse, but distinct; but in neither of the four specimens seen has there been any trace of pubescence observed on the elytra.

Hab.—Northern California and Oregon (Koebele, 40).

CEPHALOSCYMNUS Crotch.

This genus differs from *Scymnus* in having the anterior coxal cavities open behind. The thorax is narrower at base than the elytra and much more deeply emarginate at apex than in *Scymnus*. The head is more deeply inserted, the front vertical, the eyes narrowly oval, rather finely granulate, and in two species with a very feeble impression at the antennal insertion. The antennæ are very short and seem to be but 10-jointed. The abdomen has five segments, the sutures distinct; tarsal claws slightly broadened at base.

Crotch gives eleven joints to the antennæ, but I have not been able to see more than ten, in which respect Mr. H. C. Fall, of California, adds confirmation from an examination of a species taken by him.

The species at present known are as follows:

Elytra not ornate.
Body above black; elytra moderately coarsely, not densely punctate; eyes with slight impression.....**Zimmermanni.**
Body above brownish; elytra very coarsely and densely punctured; eyes scarcely visibly impressed.....**occidentalis.**
Elytra with two yellow spots often suffused.
Elytra not coarsely punctate; eyes distinctly notched.....**ornatus.**

C. Zimmermanni Cr.—Broadly oval, slightly convex, black, slightly bronzed, pubescence gray and irregular. Head moderately coarsely and not closely punctate. Eyes feebly impressed, not twice as long as wide; labrum conspicuously yellow. Thorax fully three times as wide at base as long at middle, coarsely and closely punctured, densely at the sides, no basal marginal line. Elytra broader at base than the thorax, about one-fourth longer than wide, surface more coarsely punctate than the thorax, but less closely; prosternum short and broad, nearly smooth without elevated lines; metasternum smooth at middle, punctate at sides; mesocoxal arc joining the suture one-fourth from the front. Abdomen scarcely punctate, metacoxal arc entire, half the length of the segment. Legs piceous, tibiæ and tarsi paler. Length .06—.08 inch.; 1.5—2 mm. Pl. II, fig. 10.

Crotch describes this species as dark green, which is the result of slight immaturity with the mixture of slight bronze of the surface and the pale hairs.

The type was collected in South Carolina, others are known to me from District of Columbia and Maryland.

C. occidentalis n. sp.—Oval, slightly oblong, feebly convex, paler piceous with grayish pubescence. Head moderately closely punctate. Thorax three times as wide as long at middle, sides feebly arcuate, surface closely punctate, densely and rather roughly at the sides. Elytra wider at base than the thorax, surface coarsely and closely punctate, roughly near the umbone; prosternum

nearly square, without elevated lines; metasternum at sides obsoletely coarsely punctate, the mesocoxal line indistinct. Abdomen sparsely punctate, the metacoxal arc entire, but short and indistinct. Legs paler than upper surface. Length .07 inch.; 1.75 mm.

In this species the eyes are much narrower than in the other species and the impression at the lower end so feeble that it might readily escape notice.

Hab.—Southern California, Los Angeles and southward.

C. ornatus n. sp.—Broadly oval, moderately convex, piceous, pubescence gray, directed irregularly, each elytron with two irregularly oval yellow spots not sharply defined, sometimes large, suffused and united. Head moderately coarsely and closely punctate. Eyes with well defined impression at lower angle. Thorax nearly three times as wide as long at middle, slightly narrower in front, sides feebly arcuate, surface moderately punctate. Elytra not closely nor deeply punctate; prosternum broader than long, flat, without elevated lines; metasternum punctate at the sides, the mesocoxal line joining the suture one-third from the apex. Abdomen sparsely punctate, metacoxal arc entire not half as long as the segment. Legs picco-testaceous. Length .06—.08 inch.; 1.5—2 mm.

No sexual differences have been seen in the six specimens examined. No great variation has been observed, excepting that the spots on the elytra extend and become more or less suffused. The abdomen is piceous, sometimes with the entire border paler.

This species resembles somewhat *Sc. guttulatus*, and apparently has been mixed with it in collections.

Hab.—California, Siskiyon to Alameda, also Catalina Island.

RHIZOBIUS Steph.

This genus differs from *Scymnus* in the antennæ reaching to the hind angles of the thorax. The vestiture consists of the usual pubescence of *Scymnus* with numerous short, erect hairs irregularly placed on the elytra.

R. lophanthæ Blaisd. (*Scymnus*), Ent. News, March, 1892, p. 51; *toowoombæ* Blackb., Trans. Royal Soc. South Aust. xv, December, 1892, p. 254.

Form of *Sc. collaris*.—Head and thorax reddish yellow, the latter with a central cloud variable in distinctness. Elytra piceous, with feeble æneous lustre; underside and legs reddish yellow.

It is unfortunate that an intentionally introduced insect should have been first named in the country of its expatriation.

Introduced from Australia, Brisbane.

R. debilis Blackb.—This species in color and form resembles *Sc. pallens* or *Phelpsii*. It has attained but little foothold.

Introduced with the preceding.

NOVIUS Muls.

Two species of this genus have been introduced into California for their utility in the destruction of *Icerya purchasi*, which threatened to destroy, or very greatly injure the orange and lemon trees of that State.

N. cardinalis Muls.

This insect was originally described as *Vedalia*, but recent researches place it in *Norius*. Chapuis places these two genera in separate groups, and as these two groups, Ortaliites and Scymnites, are separated especially by the thorax narrower at base than the elytra in the former it would seem preferable to remove *Norius* from the Scymnites and place it nearer to *Rodolia* and *Vedalia*.

N. cardinalis Muls.—A species as large as *Exochomus marginipennis*, but more depressed. Its elytral markings are strikingly similar to some of the varieties of that species. The elytra are red, the suture narrowly black, with two slight enlargements, the apex is black, extending one-third or more to humerus and at its end expanded, a spot partly surrounding the umbone and an oval spot one-third from apex. The legs are black, often with the tibiæ and tarsi carmine-red. Pl. II, fig. 9.

This insect is now thoroughly acclimated in the citrus growing regions of California, and very full accounts of it have appeared in many publications in that State and in "Insect Life," Washington.

Introduced from New Zealand.

N. Koebelii Olliff.

This is somewhat smaller than *cardinalis*. The elytra are reddish, the suture narrowly black, the same color extending around the apex and sides to middle. Specimens are frequent with the elytra entirely red. Thorax entirely black, while that of *cardinalis* is pale at the sides.

This species does not seem to have gained the footing of *cardinalis* although fairly acclimated.

Specimens were given me by Mr. A. Koebele, who was instrumental in introducing them from Australia, their native region.

COCCIDULA Kug.

This genus is usually placed in a group without other associates, distinguished from all the pubescent Coccinellidæ by the faint attempt at a strial arrangement of some larger punctures. It must, however, be admitted that this character seems to fail almost entirely and can be seen better by faith than with the lens.

Two species occur in our fauna.

C. lepida Lec., Proc. Acad. 1852, p. 232. The figure (Pl. II, fig. 12) gives a fair idea of the form and markings of this species, otherwise well described by Dr. LeConte.

Occurs in Canada and the New England States as far south as the latitude of Philadelphia.

C. occidentalis n. sp.—Oblong, subdepressed, finely pubescent, above in great part yellowish red, except head and elytral markings piceous, beneath piceous, except the last three ventral segments and legs, which are yellow. Head sparsely punctate. Thorax more closely punctate. Elytra much more coarsely punctate, a few of the larger punctures with faint serial arrangement; color yellow, sides and base piceous, a sutural stripe joining the base and ending in a cordiform spot one-third from apex. Length .12 inch.; 3 mm. Pl II, fig. 11.

In comparing this species with *lepida* the following differences will be observed. In the markings of the elytra there is an absolute constancy in the comparatively large series of both species scarcely the slightest variation has been observed. In *occidentalis* there is a sutural stripe ending in a cordiform spot; in *lepida* there is no sutural stripe and the spot is isolated and transversely oval. On the underside the first two segments are entirely piceous in *occidentalis*, but yellowish at sides in *lepida*.

On comparing the forms of the two *lepida* is narrower; it has also in many specimens a slight tendency to have the sides of the thorax angulate. In *lepida* the elytral punctures are, on the whole, coarser, and the serial arrangement of some coarser ones better marked.

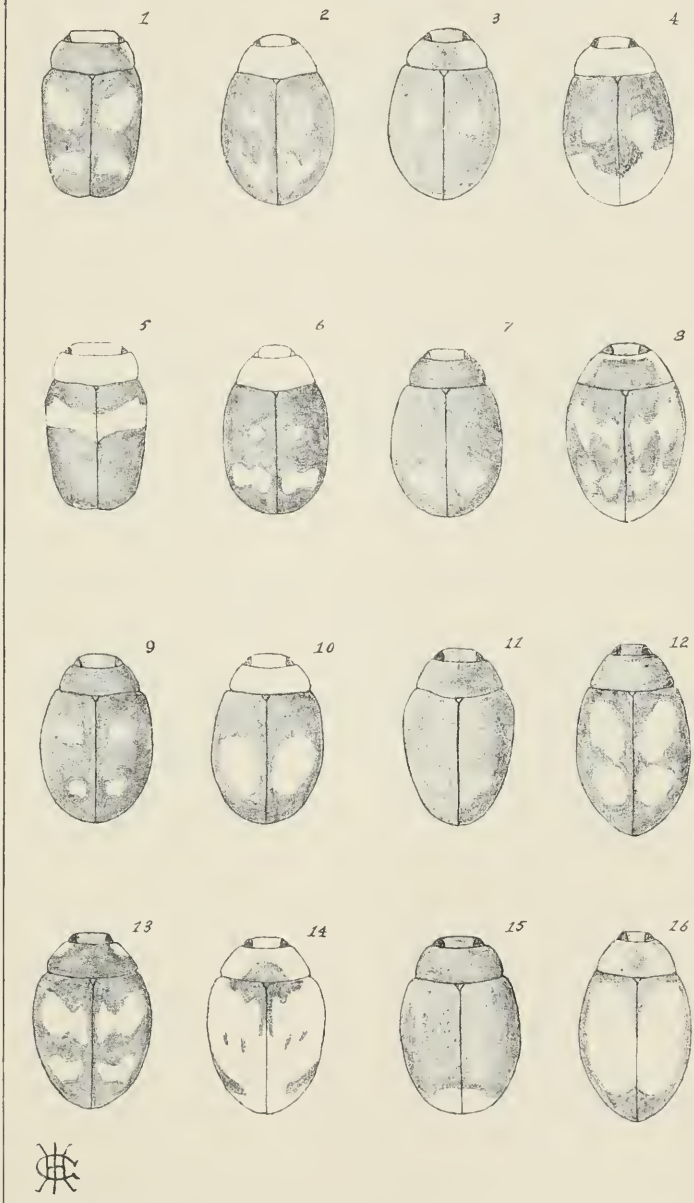
Hab.—Wyoming to Vancouver.

EXPLANATION OF PLATE I.

Fig. 1.—*Scymnus quadritæniatus* Lec.
" 2.— " *coloradensis* Horn.
" 3.— " *bigemmeus* ♂ Horn.
" 4.— " " ♀
" 5.— " *balteatus* Lec.
" 6 " *Liebecki* Horn
" 7.— " *flavifrons* Mels.
" 8.— " *amabilis* Lec.
" 9.— " *myrmidon* Muls.
" 10.— " *birulaerus* Horn.
" 11.— " *bisignatus* Horn.
" 12.— " *ornatus* Lec.
" 13.— " *guttulatus* Lec.
" 14.— " " var.
" 15. " *terminatus* Say.
" 16.— " *sordidus* Horn.

EXPLANATION OF PLATE II.

Fig. 1.—*Scymnus collaris* Mels.
" 2.— " *punctatus* Mels.
" 3.— " *fraternus* Lec.
" 4.— " *circumspectus* Horn.
" 5.— " *cinctus* Lec.
" 6.— " *strabus* Horn.
" 7.— " *pacificus* Crotch.
" 8.— " *Brullei* Mels.
" 9.—*Novius cardinalis* Muls.
" 10.—*Cephaloscymnus Zimmermanni* Crotch.
" 11.—*Coccidula occidentalis* Horn.
" 12.— " *lepida* Lec.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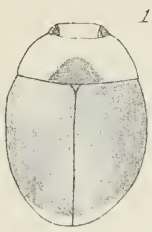
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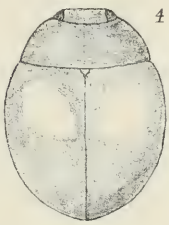
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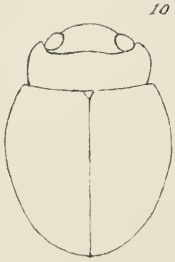
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NOTES ON BEES, WITH DESCRIPTIONS OF NEW SPECIES.—Third Paper.

BY CHARLES ROBERTSON.

With the exception of a few species from Florida, the following paper is based on the bees occurring in the neighborhood of Carlinville, Ill. It is intended to give descriptions of certain new species, and of the still undescribed sexes of known species, with notes on synonymy, etc., as well as to supplement the work of the author in previous papers by indicating other characters by which the species may be distinguished from those they nearly resemble. This paper will be followed by another on the time of flight and the habits of the local species. The synonymy and arrangement are based on Cresson's Catalogue.

Colletes inæqualis Say, Bost. Jour. i, 391, 1837; *Colletes propinqua* Cress., Proc. Bost. Soc. Nat. Hist. xii. 165, 1868—see Patton, ibid. xx, 142; *Colletes canadensis* Cress., ibid. 166.

Say says that his species flies in March and April. I have taken it from the 20th of March to the 28th of May, while the species which Cresson has doubtfully referred to *C. inæqualis* I have taken only from the 30th of August to the 7th of October. This early species, which agrees with Say's description of *C. inæqualis*, I have compared with the types of *C. propinqua* in the collection of the American Entomological Society. I have also examined the types of *C. canadensis*. A specimen which Mr. Cresson doubtfully referred to *C. canadensis* is nothing, I think, but *C. inæqualis*.

Colletes compacta Cress.

This species may be most readily distinguished from the other species known to me by its metathorax, which, instead of the usual transverse series of pits, presents a rugose triangular enclosure. It flies in Autumn.

Colletes distincta Cress.

The female closely resembles the male, but is more finely punctured, the vertex and mesoscutum have more black hairs, and the abdominal fasciæ are white, the fascia on first segment being continued upon base of second. I have taken this species in Florida.

Colletes thoracica Sm.

This handsome species, taken in Florida, may be readily identified from Smith's description. It was not recognized by Cresson.

Colletes willistonii Rob., Trans. Am. Ent. Soc. xviii. 60.

The ♂ closely resembles the ♀. This is a little smaller than *C. latitarsis* Rob. and may be distinguished by the hind tarsi being much more slender.

Colletes armata Patton, Proc. Bost. Soc. Nat. Hist. xx. 143, 1879; *C. scitula* Patton, ibid.; *C. æqualis* Cress. (nec Say), ibid. xii. 166, 1868; *C. spinosa* Rob., Trans. Am. Ent. Soc. xviii. 60, 1891.

Cresson's Catalogue does not give the synonyms of Patton's paper, for which reason I did not know of them, and redescribed this species and the next. All of the males which I have seen have some black or fuscous hairs on the thorax above, which leads me to suspect that the males referred to this species by Patton do not belong to it. I have seen an example of the type of *C. scitula* and regard it as the male of this *Colletes*.

Colletes æstivalis Patton, Proc. Bost. Soc. Nat. Hist. xx. 142–4, 1879; *C. heucheræ* Rob., Trans. Am. Ent. Soc. xviii. 61, 1891.

This species is the special pollinator of the flowers of *Heuchera*. Mr. Patton captured it on flowers of *Heuchera americana* in Connecticut, and in Illinois I have taken it abundantly on *H. hispida*.

Colletes enlophi Rob., Trans. Am. Ent. Soc. xviii. 61; *Colletes illinoiensis* Rob., ibid. 62.

This species closely resembles *C. americana* Cress., but has the abdomen more strongly punctured and with narrower fasciæ, and there is a well-marked interval between the base of the mandibles and the eyes. In *C. americana* these almost touch, while in *C. enlophi* there is quite an interval, which in the ♂ is subquadrate.

Prosopis modestus Say: *Hylæus modestus* Say, Bost. Jour. i. 392, 1837, Lec edit. ii. 771; *Prosopis affinis* Sm., Brit. Mus. Cat. Hym. i. 24, 1853; Cress., Proc. Bost. Soc. Nat. Hist. xii. 270.

Prosopis pygmæa Cress.

The ♀ has the usual spots on the bases of the tibiæ, those on anterior pair extending nearly to tip. There is a variable yellow spot on each side of face, one on tegulæ, on tubercles, and often on apex of clypeus, but some specimens show no yellow markings, except on the tibiæ. I have taken the sexes in copula.

Sphecodes arvensis Patton, Am. Ent. iii, 230, 1880; *Halictus scabrosus* Provancher, Faun. Ent. Can. 700, 1883.

This species, as well as *S. falcifer* Pttn. and *mandibularis* Cress., is common in Illinois.

Halictus foxii: *Halictus gracilis* Rob. (nec Morawitz), Trans. Am. Ent. Soc. xvii, 316.

Dedicated to Mr. Wm. J. Fox.

Halictus macoupinensis: *Halictus 4-maculatus* Rob. (nec Schenk), Trans. Am. Ent. Soc. xvii, 316.

Halictus fasciatus Nylander.

Smith, in Brit. Mus. Cat. Hym. i, 48–9, makes this a synonym of *H. tumblorum* L. and credits *H. flavipes* F. to America. Our species is the *N. fasciatus* Nyl. (*H. flavipes* Thompson).

Halictus stultus Cress.

This species may be distinguished from all of the species of *Halictus* known to me by its abdomen, which is depressed, widest at third segment, first two segments shining, third and fourth opaque and evenly clothed with sparse, closely appressed hairs.

Halictus pilosus Sm.

The ♂ of this species is like the ♀, but less pubescent. The clypeus strongly produced; the flagellum beneath, apex of clypeus, labrum, mandibles, knees, tibiæ at apex and tarsi yellowish testaceous. It resembles ♂ of *H. fasciatus*, but is smaller, legs less yellow, and abdomen without fasciæ, etc.

Halictus zephyrus Sm.

The ♀ is uniformly brassy green and usually smooth and shining, mesothorax sparsely and feebly punctured, disc of metathorax with feeble rugæ at base. The abdomen has appressed ochraceous pubescence on each side of bases of second and third segments and over fourth and fifth. I have taken the sexes in copula.

Halictus nymphæarum: *Halictus palustris* Rob. (nec Morawitz), Trans. Am. Ent. Soc. xvii, 317.

Halictus platyparius ♀.– Head and thorax dull greenish, the abdomen brownish. Face broad, wider between the eyes above than below, closely and finely punctured above, more sparsely punctured below; the clypeus short and broad, not produced; flagellum stout; cheeks broad, strongly produced to an angle below; the flagellum, mandibles, tegulæ and nervures, and legs dull testaceous; prothorax with short lateral angles, mesothorax smooth and shining, finely

and sparsely punctured, disc of metathorax with longitudinal rugæ not reaching apex; abdomen shining, impunctate with very thin pubescence; hind spurs with few teeth. Length 6 mm.

Hab.—Illinois; five specimens. It closely resembles *H. cephalicus*, but is distinguished by its face being broader above than below and the flagellum being less slender, etc.

Augochlora viridula Smith, Brit. Mus. Cat. Hym. i, 81, ♂; *A. lucidula* Smith, ibid. 81–82, ♀—see Patton, Bull. U. S. Geo. Surv. v, 366.

Augochlora fervida Smith, Brit. Mus. Cat. Hym. i, 81.

For a long time I have known only the ♀ of this, which I had determined as *A. humeralis* Pttn. Patton's description seems to indicate no difference, except that the male does not have pale tarsi.

Agapostemon viridula F.; *Apis viridula* F., Ent. Syst. ii, 342; *Agapostemon nigricornis* Cress. (nec F.), Cat. Hym. N. A., 309; *A. bicolor* Rob., Trans. Am. Ent. Soc. xx, 148.

In Cresson's Catalogue the synonym of this species is not given under *Agapostemon*, but under *Apis;* so I overlooked it and redescribed the species as *A. bicolor*.

Agapostemon sericea Först.; *Apis sericea* Först., Nov. Spec. Ins. i, 91.

As in the case of the description of *A. tricolor* Lep., nothing can be made out of the description of this insect, except that it is some male *Agapostemon*.

Andrena vicina Smith, Brit. Mus. Cat. Hym. i, 112, ♀; *A. hirticeps* Smith, ibid. 116, ♂; *A. bicolor* Rob. (nec F.), Trans. Am. Ent. Soc. xviii, 51.

This is a common and very variable species. In Illinois the common form has the pubescence of the head black, except a little ochraceous about the base of the antennæ and on the vertex; sometimes there is no ochraceous pubescence on head, except a slight indication on the vertex. The thorax is ochraceous above, but sometimes this color extends to the hairs beneath; elsewhere the pubescence is black, but specimens in which the ochraceous predominates sometimes show a pale floccus. I suspect that *A. errans* Sm. is only a variety of this species.

Andrena erythrogaster Ashmead; *Cilissa erythrogaster* Ashmead, Bull. Col. Biological Association i, 6, 1890; *A. perezi* Rob., Trans. Am. Ent. Soc. xviii, 51.

Andrena prunı Rob., Trans. Am. Ent. Soc. xviii, 51.

The male of this species closely resembles that of *A. sayi*. It is distinguished by its somewhat smaller size, clearer wings, the abdo-

men more shining, less pubescent, and the last segment beneath provided with a conspicuous tuft of hair.

Andrena erigeniæ Rob., ibid. 52.

The abdomen of the male terminates in a strongly forked process, each division of the process being quite slender and pointed.

Andrena geranii Rob., ibid. 54.

This species is often quite blue, but is sometimes quite black, without any metallic reflection.

Andrena pulchella Rob., ibid. 57.

The male of this species closely resembles the female. Besides the large spot on each side of the face, which also occurs in the ♀, the clypeus also is yellow, except two spots on the disc, and the anterior margin. The labrum has a strong process, which, from in front, appears strongly bidentate; apex of tibiæ and tarsi yellow testaceous.

Andrena aliciæ Rob., ibid. 57.

This was described from a single female specimen. I now have nine females agreeing with the type. The male agrees with the female, except in characters peculiar to the sex. This is the only *Andrena* known to me in which the female has the clypeus yellow, the same as in the male.

Andrena serotina Rob., Trans. Am. Ent. Soc xx, 148.

The insect described as the male of this species does not belong to it, but is the male of the next.

Andrena platyparia ♀. Black; head large, slightly broader than thorax; clypeus moderately convex, rather closely and strongly punctured on the sides, apical border somewhat reflexed, with lateral angles prominent; basal process of labrum quite prominent, long, narrowed towards base, or subquadrate and concave in front; third joint of antennæ about equal in length to fourth and fifth together; cheeks strongly and broadly produced behind eyes, bordered by a more or less evident rim; disc of mesothorax with rather shallow, sparse punctures, clothed with thin, pale pubescence; scutellum almost impunctate, shining; disc of metathorax with the enclosure rather strongly reticulated. Wings slightly clouded, nervures testaceous, stigma often with fuscous spot, tegulæ with testaceous spot. Abdomen shining and almost impunctate on first segment, elsewhere with fine, sparse punctures and short, sparse pubescence; segments 2–4 with narrow, white, apical fasciæ, more or less interrupted on second, anal fimbria fulvous. Legs with the pubescence inclining to ochraceous, especially the scopæ, flocens white, apical joints of tarsi ferruginous. Length 8–9 mm.

♂ = *A. serotina* Rob. ♂.

Hab.—Illinois; nineteen female specimens.

Andrena nasonii ♀.—Black; clypeus slightly convex, finely roughened, with numerous shallow punctures; basal process of labrum short, triangular, broadly truncate; third joint of antennæ about the length of fourth and fifth together, lateral depressions of face with the pubescence whitish, cheeks narrow; mesonotum opaque, finely roughened, with sparse punctures, pubescence ochraceous, disc of metathorax with triangular enclosure bordered by a raised line, rather strongly reticulated. Wings hyaline, nervures and stigma pale testaceous, tegulæ mostly testaceous. Legs with pale pubescence, the scopa with rather short hairs. Abdomen depressed, opaque, roughened with close shallow punctures, apical margins of segments slightly and broadly depressed, narrowly testaceous, with narrow whitish fasciæ, interrupted anteriorly, fimbria pale ochraceous Length 8–9 mm.

Hab.—Illinois; four specimens.

Andrena spiræana ♀.—Black: head broader than thorax; clypeus shining, thinly pubescent, rather closely and strongly punctured, with a median ridge, which is impunctate; basal process of labrum short and broad; third joint of antennæ shorter than next two together, flagellum dull testaceous beneath; mesonotum and scutellum rather closely and strongly punctured, clothed with short, thin, fulvous pubescence, metathorax strongly reticulated, the disc with several short, slightly irregular longitudinal ridges, enclosure poorly defined laterally, but bounded by a sharp ridge at the edge of the truncation. Wings hyaline, nervures and stigma testaceous, the tegulæ dull. Legs dull ferruginous, the pubescence pale fulvous. Abdomen shining, finely and sparsely punctured, the second segment presenting a faint fovea on each side near base; the apical margin depressed for about two-thirds of the segment medially, third and fourth segments depressed more than one-half, apical margins of segments 2–4 with narrow fasciæ of white pubescence, interrupted broadly on second, less so on third; fimbria fulvous. Length 9 mm.

♂.—Resembles the female, third joint of antennæ shorter than fourth. Length 7 mm.

Hab.—Illinois; one male, nineteen female specimens.

Closely resembles *A. rugosa*, but is smaller, more shining, less strongly punctured on thorax and abdomen, mesonotum more thinly pubescent. The males of this group are very hard to distinguish. They can only be readily identified by comparison with the females.

Andrena hippotes ♀.—Black, the middle tarsi and hind tibiæ and tarsi red; clypeus closely, strongly and evenly punctured; basal process of labrum short, broad, emarginate; third joint of flagellum shorter than next two together, disc of mesothorax strongly, not closely punctured, with thin, pale pubescence; enclosure of metathorax strongly rugose, poorly defined laterally, terminating in a sharp edge at truncation. Wings nearly hyaline, nervures and stigma testaceous, tegulæ with a testaceous spot. Legs blackish, apical joints of front tarsi, middle tibiæ at tips, their tarsi, and hind tibiæ and tarsi ferruginous red. Abdomen shining, closely and finely punctured, segments 2–4 depressed to the middle, or a little beyond on second; the same segments with interrupted fasciæ of white pubescence, fimbria pale fulvous; the usual fovea on each extreme side of second segment. Length 8–9 mm.

♂.—More pubescent on clypeus and mesonotum, third joint of flagellum shorter than fourth. Legs more yellow. Length 7–9 mm.

Hab.—Illinois; ten male, thirty-four female specimens.

Panurgus? andrenoides Cr., Trans. Am. Ent. Soc. vii, 62; *P.? neradensis* Cr., ibid. 214.

Some male specimens from here were referred by Mr. Cresson to *P. andrenoides*, others to *P. neradensis*. It is a common and very variable species. The last ventral segment in the male has its lateral angles reflexed as in *Andrena crataegi* ♂. The female is black, clypeus rather strongly punctured on the sides, basal process of labrum short and triangular, mandibles rufous in middle or at tips, flagellum testaceous beneath. Abdomen red, sometimes with a little blackish, or even entirely black, hind tarsi and often the tibiæ, pale ferruginous. Length 8–9 mm.

I suspect that this species belongs to Smith's genus *Scrapter*.

Panurgus autumnalis ♀.—Black, clothed with pale pubescence, which is rather short and dense on mesonotum; face finely and densely punctured, except a shining, not depressed, space along the eyes; clypeus short, very transverse, truncate; labrum nearly as large, subquadrate, rounded anteriorly, transversely striate at base; flagellum testaceous beneath towards tip; mesoscutum finely and densely punctured, disc of metathorax flat, finely sculptured. Wings whitish hyaline, nervures and stigma pale, submarginal cells of equal length, outer margin of tegulæ dull testaceous. Legs slender, pubescence pale, black, the small tarsal joints, except the last one, pale. Abdomen somewhat shining, almost impunctate, with pale pubescence at apex, apical margins of segments broadly pale testaceous. Length 7–8 mm.

Hab.—Illinois; seven specimens.

Calliopsis rugosus ♀.—Closely resembles *C. mexicanus* Cr., and *C. scaber* Fox, Proc. Cal. Acad. Sci. ser. 2, vol. iv, 115; it differs from the former by its smaller size and the abdomen being bare, except the anal fimbria, which is pale, except at tip of abdomen, where it is fulvous; second submarginal cell narrowed one-half towards marginal; from *C. scaber* it differs in having the clypeus without impressed line, and in the more closely punctured dorsulum, subequal submarginal cells and less pubescent abdomen. Length 7–8 mm.

♂.—This sex differs from that of *C. mexicanus* in its smaller size, and in being less pubescent, also in having the clypeus, a spot on each side of face, the tibiæ exteriorly and the basal joints of each tarsus yellow. Length 7 mm.

Hab.—Illinois; twelve female, one male specimens.

Calliopsis asteris ♂.—Black, slightly shining, quite bare, beneath the pubescence is rather long and quite thin, across prothorax and postscutellum and about tubercles there is a close white tomentum. Head coarsely punctured, except above antennæ on face, and closely, except on each side of face near eyes; labrum with a subquadrate, concave, shining process; antennæ black, third joint

nearly as long as two following together, mesonotum closely and finely punctured, disc of metathorax short, longitudinally striate at base. Wings dusky at apex and in marginal cell, second submarginal cell shorter than first, narrowed one-half towards marginal, receiving first recurrent nervure about one-third from base, the second at apex, or the second uniting with second transverse cubital; nervures and stigma black, tegulæ testaceous, except in front. Legs with pale pubescence, the tibial scopa whitish; first segment of abdomen shining, sparsely and finely punctured, the others densely punctured, apical margins of segments depressed and dull testaceous, anal fimbria inclining to fuscous. Length 6–7 mm.

♂.—Resembles the female, the sparse pubescence and tomentum above inclining to ochraceous; clypeus, generally a spot above, a spot on each side of face, process of labrum, middle of mandibles, tubercles usually, knees, anterior tibiæ in front and base and apex of others, and tarsi, except two or three apical joints, yellow; clypeus anteriorly and process of labrum with a narrow black edge; third joint of antennæ longer than fourth, flagellum sometimes testaceous beneath in the middle, abdomen with segments 2–4 depressed and minutely roughened at base, elsewhere more shining and more sparsely punctured than in female. Length 5–6 mm.

Hab.—Illinois; seven females, twenty-three males. The sexes were taken in copula.

Calliopsis rudbeckiæ ♀.—Black, shining, slender, pubescence thin and pale, except on mesothorax above, where it is close and ochraceous; clypeus and sides of face rather coarsely and sparsely punctured, elsewhere more closely and finely punctured; middle of labrum presenting a subquadrate space which is concave, shining, finely striate at base and emarginate apically; mandibles rufous; antennæ black, third joint about as long as two following together; mesonotum and scutellum shining, finely and evenly punctured, clothed with rather close pubescence; metathorax bare, shining, disc short, striate basally. Wings subhyaline, second submarginal cell shorter than first, narrowed nearly one-half towards marginal, receiving first recurrent nervure about one-third from base and the second near apex, nervures and stigma dark, tegulæ testaceous. Legs blackish, anterior and middle knees with a yellow spot, basal joint of hind tarsi paler, the scopa whitish. Abdomen shining, especially first segment, which is almost impunctate, other segments finely and closely punctured toward base, broad apical margins smooth, piceous, anal fimbriæ ochraceous. Length 6 mm.

♂.—Resembles male of preceding, but is distinguished from it, and all other male *Calliopsis* known to me, by its clypeus presenting a broad median depression, which is impunctate, or nearly so. Length 5–8 mm.

Hab.—Illinois; twenty-three females, forty-two males.

Calliopsis labrosus ♀.—Black, shining, thinly pubescent; face with shallow punctures of medium size, rather sparse, except above antennæ; labrum presenting a median facet, which is strongly narrowed to an apex, which is truncate or rounded; third joint of antennæ nearly as long as two following together, flagellum testaceous beneath, at least the middle joints; mandibles, sometimes the clypeus anteriorly, and the labrum entirely testaceous, the mandibles more

rufous; anterior and middle knees and sometimes tubercles yellow; prothorax and about tubercles with a short ochraceous tomentum; mesonotum nearly bare, with close, rather coarse punctures anteriorly, becoming finer and more sparse posteriorly; disc of metathorax short, irregularly striate at base, smooth and shining. Wings hyaline, or nearly so; second submarginal cell shorter than first, narrowed about one-third towards marginal; nervures testaceous, stigma fuscous, tegulæ testaceous. Legs blackish, scopa white. Abdomen shining, especially the first segment, which is almost impunctate, segments broadly depressed, all except first finely punctured, anal fimbria pale ochraceous. Length 6–7 mm.

♂.—More coarsely and closely punctured; clypeus, a spot above, one on each side of face, labrum, mandibles except tips, knees, anterior tibiæ in front and tarsi, except apical joints, yellow; tegulæ a little darker, middle joints of flagellum testaceous beneath; basal process of labrum slightly emarginate at tip. Length 5–6 mm.

Hab.—Illinois; seven females, two males.

Calliopsis compositarum Rob., Trans. Am. Ent. Soc. xx, 274. ♀.—The male closely resembles the female, the nervures darker; scape and flagellum long; face below, antennæ, labrum, mandibles, except tips, knees, tibiæ, except spot behind anterior pair and on each side of others, and tarsi, except claw joints yellow. Length 5–6 mm.

Hab.—Illinois; sixty-six females, twenty-six males. This species is easily distinguished by its densely punctured mesothorax, the punctures large and shallow.

Nomada affabilis Cr., ♂, Trans. Am. Ent. Soc. vii, 74, 1878; *Nomada vincta* Cr. (nec Say), ♀, Proc. Ent. Soc. Phil. ii, 284, 1863. Female.—Mandibles simple, third joint of antennæ longer than fourth, flagellum dull ferruginous beneath, darker above; mesonotum ferruginous or black, with four yellow or ferruginous lines, large spot on pleura and on each side of metathorax yellow.

♂.—Third joint of antennæ longer than fourth, apical segment of abdomen entire, thorax more black, scape cylindrical, yellow beneath.

This is a vernal species, and flies in the neighborhood of Carlinville from the 18th of April to the 20th of June.

Nomada vincta Say, Bost. Jour. i, 401; Lec., edit. ii, 778, 1837.

I have four females of this species which agree well with Say's description. It is a little smaller than preceding, less strongly punctured, more black, less pubescent, face below antennæ ferruginous, orbits yellow, third joint of antennæ longer than fourth, flagellum dusky in the middle, mesonotum black, with a narrow ferruginous margin over tegulæ, in one specimen with an indication of two median ferruginous lines; otherwise resembling preceding.

The male closely resembles female, so much so that there can be no doubt to one having both sexes before him; scape club-shaped, rounded above, of same color as flagellum, third joint of latter longer than fourth, apical segment of abdomen entire.

I think the male described by Say does not belong here. This is an autumnal species, and in my neighborhood flies from September 12 to 26.

The two preceding species of *Nomada* resemble *N. superba* in having the third joint of antennæ longer than fourth, and the apical segment of the abdomen in the male entire, not bifid as in many other species.

Among specimens which I originally referred to *N. luteola* Lep., I find a number of individuals which indicate a distinct, though closely allied species. The ornaments are very similar, but the structural characters of antennæ and metathorax are quite different. The following descriptions indicate the more important distinctions.

Nomada luteola ♀.—Third joint of antennæ shorter than fifth and nearly one-half shorter than fourth, enclosure of metathorax roughened at base, minutely roughened beyond, large subquadrate spot on each side of metathorax extending into enclosure.

♂.—Antennæ with joints cylindrical, not denticulate, third joint one-half, or even less, as long as fourth, enclosure of metathorax roughened at base, minutely so beyond.

Nomada luteoloides ♀.—Third joint of antennæ shorter than fourth, the latter only a little longer than fifth, enclosure of metathorax rather strongly rugose throughout, spot on each side hardly subquadrate and not encroaching on enclosure.

♂.—Antennæ submoniliform, joints 7–10 each with an evident denticle beneath near apex, third joint shorter than fourth, but not greatly so, insect black, with yellow ornaments.

Hab.—Illinois; two females, eight males.

Nomada articulata Sm., Brit. Mus. Cat. Hym. ii. 248; nec. Cr. Proc. Ent. Soc. Phil. ii, 297.

This species resembles the male of preceding. The ornaments are ferruginous, except those of head and abdomen and a spot on pleura, which are yellow; antennæ more moniliform, the denticles beneath joints of flagellum more evident, fourth joint a little longer than third or fifth, which are subequal.

Nomada americana Kby., Faun. Bor.-Am. iv, 269, 1837; *N. bisignata* var. Say, Bost. Journ. i, 402, 1837; *N. valida* Sm., Brit. Mus. Cat. Hym. ii, 246, 1854; *N. annulata* Sm., ibid. 248, ♂ (nec ♀); *N. articulata* Cr. (nec Sm.), Proc. Ent. Soc. Phil. ii, 297, 1863; *N. incerta* Cr., ibid. 309.

Osmia bucephala Cr., Proc. Ent. Soc. Phil. iii, 17, ♀; *O. latitarsis* Cr., ibid 20, ♂.

Osmia albiventris Cr., Proc. Ent. Soc. Phil. iii, 31, ♂ ♀; *O. rustica* Cr., ibid. 37, ♂.

Megachile 6-dentata ♂.—Black, robust, with abundant pubescence, which is ochraceous above and white beneath, face densely pubescent, that on clypeus white, on face above ochraceous; mandibles and antennæ black, vertex shining, with median sized, close, shallow punctures, mesonotum opaque, more densely and finely punctured, the pubescence rather short and thin, but not with any admixture of black. Wings hyaline, apical margin faintly dusky, nervures dark, tegulæ testaceous. Legs dull ferruginous, anterior femora and tibiæ ferruginous within, coxal spines nearly concealed by pubescence. Abdomen shining, rather coarsely punctured, especially towards apex, first segment widely excavated at base, disc in middle quite short, the segment with long ochraceous pubescence; remaining segments with short, thin, ochraceous pubescence, except on apical margins of segments 2–4 and basal margins of 4–6, where it is dense and depressed; sixth segment with the usual elevation, which, however, is unusually prominent, narrow and deeply and roundly notched, so that it appears like two large spines and exposes to view two prominent spines on each side of the apical margin, beyond these on the seventh segment appears a conspicuous elevation, which is itself bidentate at apex. Length 11 mm.

Hab.—Illinois; one male.

Megachile floridana ♂.—Black, robust, vertex and abdomen somewhat shining, pubescence beneath rather long and white, on the face dense and with a tinge of yellowish, on the vertex, mesonotum and discs of abdominal segments, except first and sixth, it is black; mandibles large, black, flagellum dull testaceous beneath, mesonotum more closely punctured than vertex or abdomen. Wings subhyaline, with a purplish reflection, apical margin dusky, nervures dark, tegulæ black; coxal spines conspicuous, flattened. Legs black, anterior femora and tibiæ within, and apex of tibiæ yellow; tarsi white and with a dense brush of white pubescence posteriorly, the joints strongly flattened, but not otherwise greatly modified, first joint widens to apex, second about as wide as apex of first, from which the tarsus narrows to the claw joint, middle and hind tarsi pale yellowish anteriorly, the middle tarsi strongly ciliate posteriorly, all the claws honey-yellow with dark tips; basal segment of abdomen strongly excavated, the disc not unusually narrow and clothed with long pale pubescence, apical margins of segments 2–5 with fasciæ of pale pubescence much wider on sides; elevation of sixth segment prominent, not deeply notched in the single specimen before me; the extreme edges of this segment presents on each side a small inconspicuous spine, and a rounded carinate elevation further inward. Length 12 mm.

Hab.—Florida; one male.

Ceratina tejonensis Cr., Proc. Ent. Soc. Phil. ii, 390, ♂.

This was described from a California specimen, but in Cresson's Catalogue it is credited to Nevada, and it was found by Provancher in Canada. It is common in Illinois. I have thirty-five specimens; it is quite as common as males of *C. dupla*, and I have taken it from March 21 to September 23. I find no difference from males of *C. dupla*, except in structure of hind femora, and this does not present any intermediate forms. The trouble is that I do not find any female for it, and I suspect that it is a dimorphic male of *C. dupla*, or that its female cannot be distinguished from that species. I think it will be found wherever *C. dupla* occurs.

Synhalonia frater Cr.; *Melissodes frater* Cr., Proc. Acad. Nat. Sci. Phil. 1878, 195, ♂; *Synhalonia frater* Patton, Bull. U. S. Geol. Surv. v, 474; *Melissodes speciosa* Cr., Proc. Acad. Nat. Sci. Phil. 1878, 198, ♀; *Melissodes dilecta* Cr. ibid. 199, ♂.

This is a common species in Illinois. I have often taken the sexes in copula. I have seen the types of *S. frater* in the collection of the American Entomological Society. They are worn and faded specimens.

Synhalonia belfragei Cr.; *Melissodes belfragei* Cr., Trans. Am. Ent. Soc. iv, 278, ♀; *Melissodes honesta* Cr., ibid. 279, ♂; *Synhalonia honesta* Patton, Bull. U. S. Geol. Surv. v, 474, ♂.

This is also common in Illinois. I have taken the sexes in copula.

Synhalonia atriventris Sm.; *Melissodes atriventris* Sm., Brit. Mus. Cat. Hym. ii, 310, 1854, ♂; *Synhalonia atriventris* Cr., Cat. Hym. N. A., 305, ♂; *Melissodes dubitata* Cr., Proc. Acad. Nat. Sci. Phil. 1878, 191, ♀.

Synhalonia nigripes Sm.; *Melissodes nigripes* Sm., Brit. Mus. Cat. Hym. ii, 311, 1854, ♀.

Melissodes illinoensis ♀.—Black; clypeus finely roughened, closely punctured with rather coarse, shallow punctures, except a median elevated line, apex ferruginous; labrum yellow, with dense pale pubescence; mandibles honey-yellow in the middle, with a yellow streak at apex; antennæ black, tip of scape and second joint ferruginous, third joint black, a little longer than next two together; remaining joints ferruginous, darker above; vertex shining, naked and feebly punctured; sides of face and cheeks beneath with white pubescence, occiput above with ochraceous pubescence; mesonotum and scutellum closely punctured, hardly shining, pubescence rather short and ochraceous, except on the disc and edge of scutellum, where it is fuscous. Wings hyaline, nervures and tegulæ testaceous; submarginal cells of about equal length, third narrowed one-

half above. Legs blackish, the pubescence ochraceous, apical joints of tarsi ferruginous, scopa whitish. Abdomen opaque, first segment with ochraceous pubescence at base and on sides, apex rather broadly pale testaceous, basal margin of second with a narrow fascia of appressed ochraceous pubescence, broad apical margins of segments 2–4 with dense, appressed, white fasciæ, pubescence of fifth and sixth segments black or fuscous, beneath the abdomen has dense, ochraceous pubescence. Length 12 mm.

♂.—Resembles the female, the pubescence being longer and thinner, tegulæ and nervures sometimes darker, segments 2–4 of abdomen with margins sometimes more evidently testaceous, fascia at base of second segment white, fifth segment also with a white fascia, and sixth with pubescence sometimes black, sometimes pale; clypeus, labrum and mandibles at base pale yellow, the latter at apex with an orange-yellow streak; third joint of antennæ as long, or twice as long, as second, fourth longest of all, flagellum fulvous beneath, apex of tibiæ and the tarsi ferruginous, or sometimes the knees and the tibiæ and tarsi entirely ferruginous. Length 11–12 mm.

Hab.—Illinois; one female, three males.

Melissodes pallida ♀.—Black, clothed with pale pubescence, which inclines to ochraceous on the thorax above; face rather closely pubescent, clypeus closely and strongly punctured, mandibles rufous in middle, with a yellow streak at apex, antennæ black, third joint about equaling next two together, flagellum dull testaceous beneath. Thorax above densely pubescent, except on disc of mesonotum and scutellum, more sparsely punctured on former. Wings subhyaline, second submarginal cell a little smaller than first, third narrowing one-half above, nervures dull testaceous, tegulæ piceous. Legs black, apical joints of tarsi ferruginous; pubescence pale ochraceous, becoming fuscous on apex of tibiæ and tarsi, scopa pale, on the basal joint of hind tarsi within it is black. Abdomen opaque, basal segment with pale pubescence at base and laterally, base of second and broad apical margins of segments 2–4 with appressed white pubescence, segments 5 and 6 with black pubescence, the abdomen beneath has the pubescence fuscous, paler towards apex. Length 14 mm.

Hab.—Illinois; one female. This looks like the female of *Synhalonia frater*, but is a little smaller, and has paler legs, etc.

Melissodes nivea ♀.—This species closely resembles *M. perplexa* Cr., but is distinguished by the pubescence being longer, more dense and more whitish; the anterior margin of occiput above with few fuscous hairs, mesothorax with dense cinereous pubescence, except about bare space on posterior margin of mesonotum and scutellum, where it is slightly fuscous. Wings whitish hyaline, the nervures testaceous. Legs with pale pubescence, except sometimes on anterior tarsi, where it is tinged with fuscous, scopa white; first segment of abdomen with posterior margin pale testaceous, the fasciæ on segments 2–4 more broad and white than in *M. perplexa*. Length 10 mm.

Hab.—Illinois; seven females.

Anthophora ursina Cr., Trans. Am. Ent. Soc. ii, 291, ♂.

This species is common in Illinois. The female bears a very strong resemblance to *Habropoda floridana* Sm., but is distinguished by the venation. It is distinguished from *A. abrupta* Say by its larger size, the first segment of abdomen having more ochraceous pubescence, and the ochraceous color of thorax not being continued down the sides beyond the middle. The type of the male is faded, fresh specimens having the pubescence of thorax more ochraceous.

THE CRABRONINÆ OF BOREAL AMERICA.

BY WILLIAM J. FOX.

The Crabroninæ form a well-marked subfamily of the Sphegidæ, and includes the genera *Entomognathus*, *Anacrabro* and *Crabro*, and has a vast number of described species in the world. This is particularly true of Europe, which has in the neighborhood of one hundred and fifty known species; fully two-thirds of that number are treated of in this paper as occurring in Boreal America, including Canada, the United States and the peninsular of California (Lower or Baja California); and it is safe to say this number will be greatly increased in the near future, and that our fauna will be found to be fully as rich in species as that of Europe. The species of *Crabro* are in many cases difficult to separate, and this, together with the fact that our only existing monograph is faulty as to the arrangement of the species, allied forms in many cases being placed in different groups, and the overlooking of important characters, and the magnification of minor points, has caused confusion in more than one case, as I know from experience. I was fortunate in having the types of nearly all of Packard's species, which aided materially in straightening out many points, which otherwise would have remained obscure. Cresson's types were also of much assistance. It must not be understood for an instant that I mean to invalidate the work of the author of the above-mentioned monograph, whose Revision of the Fossorial Hymenoptera of North America, published nearly thirty years ago, was an epoch of importance to American Hymenopterology.

Crabro divides into numerous groups, some being well marked and others difficult to separate, or differing in points only to be found in one sex. Many of these groups of species were of generic importance in the eyes of Lepelitier de St. Fargeau and his colleague Brullé, who, in their Monographie du Genre Crabro, recognized eleven genera, ten of which were of their own making. Dahlbom, in his Hymenoptera Europæa, eleven years later reduces these to the value of subgenera, evidently, and adds three new subgenera. Shuckard, before the publication of Dahlbom's work, rejects all of the names proposed by St. F. and Brullé, and Smith, in Catalogue

of Hymenopterous Insects in the collection of the British Museum, Pt. III, synonymizes completely the genera and subgenera made by the above mentioned authors, adding thereto the genus *Entomognathus* Dahlb. Morawitz, Einige Bemerkungen über die Crabro-artigen Hymenopteren, divides the species into two groups and seventeen subgroups, which he states will probably have to be reduced to nine. This author uses the names proposed by St. Fargeau and others to distinguish the groups and names several for the first time.

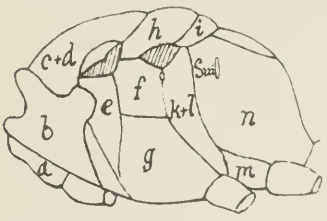
Following closely on Morawitz's work Packard's monograph of the Crabroninæ appeared. This author, evidently influenced by Shuckard's and Smith's work, throws the greater number of the proposed genera, subgenera, etc., together under *Crabro*, but recognizes *Thyreopus*, *Blepharipus* and *Rhopalum*, and describes his *Anacrabro*.

Thomson, Hymenoptera Skandinavia, III, recognizes *Rhopalum*, *Entomognathus* and *Lindenius* as genera, and under *Crabro* has twelve subgenera, named as in Morawitz's work. Kohl, Raubwespen Tirols lists eleven subgenera and one species of doubtful position. Cameron, Biologia Centrali-Americana comes out on the lines laid down by Shuckard and Smith, and discards entirely the genera, subgenera and groups proposed by preceding writers.

It will be seen from the foregoing review, for which the author is partly indebted to Kohl's, Die Crabronen der Section Thyreopus Lep., that hymenopterists had accepted no classification of these wasps as a standard, but were on the contrary almost to a unit dissatisfied with the work of their colleagues, and therefore endeavored to form a system which each thought the most natural. It is not surprising that St. Fargeau and Brullé considered *Crabro* worthy of more than one generic name, when the few species then described are taken into consideration, nor is it remarkable that with the constantly increasing number of known species, each classification differed; so it is to-day that I feel compelled to accept the system of Shuckard and Smith almost *in toto* and discard the many names erected for subgenera, groups, or whatever they have been considered, and unite under one head, *Crabro*. I take exception, however, to regarding either *Entomognathus* or *Anacrabro* as synonyms with *Crabro*, as they possess characteristics, always constant, and not found elsewhere.

From the Oxybelinæ, the Crabroninæ differ—1, by the very broad eyes, usually narrowed at the top; 2, the metanotum without squamæ, and the middle segment not armed basally with a spine; 3, the neuration of the fore-wings, which contain a distinct submarginal cell,

while in *Oxybelus* the submarginal cell is wanting, being merged into the first discoidal cell; the second discoidal cell in *Oxybelus* is short and broad, in the Crabroninæ long and narrow. The neuration of the Crabroninæ is very similar to that of the genus *Trypoxylon*, but in the hind wings it differs: in *Trypoxylon* the neuration is complete, the submedian cell long, narrow, fully half as long as the median; in the Crabroninæ it is incomplete, chiefly through the absence of the marginal, cubital and discoidal veins beyond the median and submedian cells, and the submedian cell is shorter, although its length varies to a certain extent. In *Entomognathus*, however, there is a faint trace of the marginal vein beyond the median cell, which fact further strengthens its right to generic rank.



Thorax of *Gorytes mystaceus* (after Handlirsch), in detail, to explain the terms used in this paper, as applied to the parts of the thorax.

a, prosternum; *b*, pronotum; *c* × *d*, dorsulum; *e*, episternum mesopleuralis; *f*, epimerum mesopleuralis*; (*e* × *f*, mesopleura) *g*, mesosternum; *h*, scutellum; *i*, metanotum (postscutellum); *k* × *l*, metapleura (*k*, episternum; *l*, epimerum); *m*, metasternum; *n*, middle segment.

The three genera recognized in the present paper are distinguished as follows:

Eyes hairy; mandibles emarginate externally.....**Entomognathus** Dahlb.

Eyes naked; mandibles entire externally.

Second discoidal cell long, narrow, much longer than the first, acuminate at tip, or obtusely pointed; epimerum mesopleuralis with a strong medial ridge, extending from near the tegulæ to the medial suture of the mesosternum, the anterior ridge of episternum mesopleuralis meeting it a little before its termination. Abdomen strongly depressed, beneath subconcave. **Anacrabro** Pack.

Second discoidal short, shorter than the first, generally much so, at any rate never longer, broadened and subtruncate at tip; epimerum mesopleuralis at the most with a ridge or crest just before the medial coxæ, sometimes entirely wanting, or represented by a small, pointed prominence. Abdomen but little depressed, convex above and beneath.**Crabro** Fab. (s. l.)

In the preparation of this paper it was found impossible to identify the many subgenera and groups into which *Crabro* has been divided. Such confusion seems to exist in the work of the older European authors that the identification of the groups is an impossibility, without the aid of authentically determined specimens of European

* In the Crabroninæ this part is not restricted by a suture, as in *Gorytes*, but includes the greater portion of the mesopleuræ, and the sternum does not extend on the sides as shown in the above figure.

species, which at the present writing I do not possess. Inability of determining the subgenera, groups, etc., was not, however, my reason for the discarding the names in this paper, but because their use would have necessarily led to the application of many more, a practice too much in vogue in late years, and which should be discouraged.

The author desires to express his thanks for favors received from the following persons, all of whom have either contributed specimens, or have otherwise assisted: E. T. Cresson, Wm. H. Ashmead, C. V. Riley, W. H. Harrington, J. A. Guignard, W. A. Nason, T. D. A. Cockerell, G. C. Davis, A. S. Packard, O. B. Johnson, C. W. Johnson, Mrs. A. T. Slosson and others.

ENTOMOGNATHUS Dhlb.

Crabro (in pt.) V. d. Linden, Obs. ii, 70, ♂ ♀.
Crabro (in pt.) Shuckard, Foss. Hym. p. 175, sp. 33.
Lindenius (in pt.) St. F. and Brullé, Ann. Soc. Ent. Fr. iii, 800, 1834.
Entomognathus Dahlbohm. Hym. Eur. i, 295.
Crabro (in pt.) Smith, Morawitz, etc.
Entomognathus Thomson, Hym. Skand. iii, 259; Cresson, Synopsis Hym. pt. 1, p. 122.

Eyes covered with short hair; mandibles emarginate externally, unarmed at apex. Antennæ ♀ and ♂ 12-jointed; episternum mesopleuralis not ridged anteriorly, the epimerum without a central ridge or a crest before medial coxæ; second discoidal cell about as long as the first, broadest medially, subtruncate at apex; sculpture subtle. Abdomen strongly convex above and beneath, the last dorsal segment of both sexes with a well developed pygidium.

Entomognathus texanus Cress.

Entomognathus texanus Cresson, Synopsis Hym. pt. 2, p. 286, ♀ ♂.

♀.—Head very sparsely punctured; frontal impression strong, as are also those running from the hind ocelli to inner orbits; dorsulum and mesopleuræ apparently impunctate; scutellum longitudinally impressed; middle segment above with large fossulets, formed by coarse rugæ, posterior face strongly rugose, bearing two strong carinæ, which diverge from the centre of the apex, forming a V, sides nearly smooth; abdomen, except pygidium and second ventral segment, impunctate, the parts mentioned bearing large punctures, those on the second ventral much scattered; pygidium long, triangular, covered with appressed pubescence. Black; shining, mandibles basally, scape, two widely separated spots on pronotum, tubercles, spot on tegulæ, two spots on scutellum, tips of all the femora, particularly the four anterior tibiæ, except a dark spot within; tarsi (apical joints darker), and a large spot on dorsal abdominal segments 1–5, yellow; pubescence of clypeus and inner orbits, silvery. Wings fusco-hyaline with a yellowish tinge, nervures and stigma black. Length 7 mm.

♂.—Has the yellow on pronotum and legs more prominent, and the clypeus entirely yellow; last joint of antennæ nearly as long as the two preceding ones

united, somewhat curved and truncate apically; fore tarsi a little flattened, hind tarsi broader than in the ♀; second ventral abdominal segment rather finely and closely punctured; pygidium truncate at apex. Wings a little darker than in the ♀. Length 6 mm.

Texas. Very distinct from the European *E. brevis*.

ANACRABRO Pack.

Anacrabro Packard, Proc. Ent. Soc. Phila. vi, p. 67; Cresson, Synopsis Hym. pt. 1, p. 122.

Crabro (in pt.) Kohl, Zool. Jahrb. (Abth. f. Syst., etc.), iii, p. 555.

Eyes naked; mandibles entire externally, unarmed at apex. Antennæ (♀) 12- (♂) 13-jointed; episternum mesopleuralis sharply ridged anteriorly, the epimerum with a strong, central ridge extending from near the tegulæ to the central suture of the mesosternum; second discoidal cell long, narrow, much longer than the first and acuminate at tip; sculpture coarse. Abdomen depressed, subconcave beneath, the last dorsal segment in both sexes with a well-developed pygidium, the first segment not impressed, but possessing two very strongly diverging keels.

Anacrabro ocellatus Pack.

Anacrabro ocellatus Pack., Proc. Ent. Soc. Phila. vi, p. 68. ♀.

♀.—Head transverse, with strong, scattered punctures; frontal impression remarkably strong; posterior orbits channeled, and the cheeks with a long keel; dorsulum and mesopleuræ with strong, separated punctures, those on scutellum larger and sparser; middle segment above with strong foveæ formed by coarse rugæ, posterior face coarsely rugose apically, with a strong triangular depression on basal middle, lateral ridges strongly developed, sides with rather strong, close punctures, on basal portion, however, somewhat striated; femora broad, the anterior pair flatter than the others; tibiæ strongly spinose; abdomen, dorsally, with strong, separated punctures, ventrally impunctate; pygidium large, pointed at tip, very coarsely punctured, sides a little rounded. Black, including scape and mandibles, except a rufo-piceous spot in middle; no yellow on pronotum; tubercles, line on metanotum, tips of all the femora, tibiæ and tarsi, except a dark spot on the former internally, and a large spot, sharply truncate externally and more or less pointed within, on dorsal abdominal segments 1–5, yellow; abdomen testaceous ventrally. Wings on basal half subhyaline, apically fuscous, or the fuscous forms a broad apical margin; pubescence of clypeus and front silvery. Length 6—7.5 mm.

♂.—Similar to the ♀, except that the pygidium is shorter, broader, and broadly truncate at apex, and is not as distinctly defined; the markings are precisely as in the other sex. Length 6 mm.

Massachusetts, New Jersey, Illinois, West Point, Neb. (Barber).

CRABRO Fabr. (s. l.)

Vespa (in pt.) Linné, Syst. Nat. Ed. 10, 1758.
Sphex (in pt.) Linné, Faun. Suec., 1761.
Sphex (in pt.) J. C. Schäffer, Icon. Ins. i, 1766.
Crabro (in pt.) Fabricius, Syst. Ent., 1775.
Pemphredon (in pt.) Fabricius, Syst. Piez., 1804.
Crabro Latreille, Hist. Nat. Ins. xiii, 1805; Gen. Crust. et Ins. ii, 1809.
Rhopalum Kirby, Stephen's Syst. Cat. Br. Ins., 1829.
Crabro St. Fargeau et Brullé, Ann. Soc. Ent. Fr. iii, 1834.
Solenius St. Fargeau et Brullé, ibid.
Blepharipus St. Fargeau et Brullé, ibid.
Ceratocolus St. Fargeau et Brullé, ibid.
Thyreopus St. Fargeau et Brullé, ibid.
Thyreus St. Fargeau et Brullé, ibid.
Crossocerus St. Fargeau et Brullé, ibid.
Lindenius St. Fargeau et Brullé, ibid.
Dasyproctus St. Fargeau et Brullé, ibid.
Corynopus St. Fargeau et Brullé, ibid.
Physoscelus St. Fargeau et Brullé, ibid.
Ectemnius Dahlbohm, Hym. Eur i, 1845.
Brachymerus Dahlbohm, ibid.
Megapodium Dahlbohm, ibid.
Anothyreus Dahlbohm, ibid.
Podagritus Spinola, Gay's Hist. Chili, vi, Atlas (zool.), Pl. II, fig. 6, 1851.
Trachelosimus Morawitz (Group), Bull. Acad. Imp. Sciences, St. Petersburg, ix, 1866.
Tracheliodes Morawitz (Group), ibid.
Cuphopterus Morawitz (Group), ibid.
Clytochrysus Morawitz (Group), ibid.
Cuclocrabro Thomson, Hym. Skand. iii, 1874.
Hoplocrabro Thomson, ibid.
Microcrabro Saussure, Grandidiers Hist. Madagascar xx, 1890.
Mesocrabro Verhoeff, Entom. Nachrichten, xviii, 1892.

Head large, generally quadrate or subquadrate, sometimes more transverse, its posterior margin always more or less margined, sometimes, however, indistinctly (group *pedicellatus*); *eyes naked;* ocelli distinct, forming a triangle or a curved line; face depressed; mandibles dentate, or unarmed internally, *externally entire*, at apex either bidentate in both sexes, tridentate in some males, or simple (group *pinguis*); antennæ 12-jointed in female, and in the male of many species, although the normal number in this latter sex is 13; flagellum subject to many modifications in the male, being entire, emarginate or dentate beneath, or greatly dilated and fringed (group *largior*); pronotum transverse, short, rounded or dentate laterally, notched medially; dorsulum convex, the parapsidal grooves usually distinct, or represented by ridges; episternum mesopleuralis with a very strong ridge anteriorly, sometimes extending on and bounding

anteriorly the mesosternum, and in some species entirely absent, epimerum mesopleuralis separated from the episternum by a strong, generally foveolated furrow, *armed with a strong crest just anterior to the medial coxæ*, which is sometimes represented simply by a small pointed prominence (groups *ventralis* and *hilaris*), or is absent (groups *pinguis* to *pedicellatus* incl.); middle segment marked by a longitudinal central furrow and usually by a curved one which encloses its upper surface, posterior face with or without a lateral ridge, sides flat or depressed, divided sometimes by a medial, longitudinal furrow. Legs in female simple, never very strongly spinose, in the male subject to great variation, the fore trochanters being sometimes spined, the fore femora simple, dentate at base beneath, armed with a long spine beneath between base and middle, or flattened and dilated basally, fore tibiæ simple, or bearing a large vari-shaped shield as in groups *tenuiglossus* and *largior*, fore tarsi simple, flattened, dilated, or distorted (group *largior*); medial tibiæ with one spur, first joint of medial tarsi simple, or having a peculiar form and its length variable; hind tarsi simple, the first joint, however, varying in length in some cases; anterior wings consisting of a median, submedian, a marginal, one cubital (submarginal) and two discoidal cells, costal cell closed, *the second discoidal is generally much shorter than the first*, although in some groups is of the same length; hind wings with a median and submedian cell, the latter being much shorter than the former. Abdomen elongate, *convex above and beneath;* segments even, or contracted at base and apex (group *interruptus*), the first segment varying from petiolate to almost sessile; in the petiolate form it is longitudinally furrowed at base, and in the more sessile forms with a strong basal depression, which is bounded outwardly by a ridge; *female only with a pygidial enclosure*, except in one group (*pinguis*), the form of which varies—sometimes broad, flat, again much contracted and deeply channeled; last dorsal segment of male with or without a medial furrow; sculpture very variable.

1. Group *interruptus*.

The species of this group have the bodies, particularly the head and thorax, very coarsely sculptured, being covered usually with great, coarse punctures, which on the dorsulum, scutellum and mesopleuræ are often interspersed with strong striæ and the sides of the middle segment are usually coarsely striated. The medial produced

portion of the clypeus is longer and narrower than in any of the succeeding groups having the clypeus so shaped. In the male the flagellum is not dentate or emarginate beneath, the fore femora are armed with a tooth beneath near the base, the fore tarsi are slightly flattened, but not broadened, and the first joint of medial tarsi is somewhat enlarged near the base, giving the joint a somewhat sinuated appearance.

1. **Crabro cinctellus** n. sp.

♀.—Head strongly punctured, particularly on the front, the punctures closest and finest behind the ocelli and on the cheeks; pronotum very strongly developed, larger by far than in any of the allied species and armed with a large tooth on each side; scutellum more striated than punctured; middle segment above with coarse, longitudinal striations, the posterior face with transverse ones, sides coarsely, but more evenly striated, upper surface separated from the posterior face by a transverse series of large foveæ; fore and medial femora somewhat angular beneath near the base; first dorsal abdominal segment with tolerably strong, separated punctures, those on segments 2–5 finer and more even, second ventral in the middle with large, sparse punctures. Black; scape, pedicellum, pronotum, tubercles, episternum mesopleuralis more or less, a small spot above on epimerum mesopleuralis sometimes absent (as are likewise spots on metapleuræ, upper and posterior surfaces of middle segment), scutellum with two dots, one on each side just anterior to it, metanotum, hind coxæ beneath, apex of trochanters, femora except a black spot on upper surface of fore and medial femora at base and a dark streak on posterior surface of hind pair, tibiæ, tarsi (apical joints darker), a broad band on dorsal abdominal segments 1–5, a spot on each side of the sixth, and ventral segments 2–5, more or less, generally almost entirely, bright yellow; pubescence of face and clypeus with a golden tinge. Wings subhyaline, with a slight yellowish cast, the nervures and stigma pale testaceous. Length 9–10 mm.

Nevada. Four specimens labeled *cinctellus* Cress., evidently a manuscript name. A handsome and striking species.

2. **Crabro interruptus** St. Farg. et Br.

Solenius interruptus St. Farg. et Brullé, Ann. Soc. Ent. Fr. iii (1834), p. 716, ♀.
Crabro confluentus Say, Bost. Journ. N. H. i, p. 376, ♀ ♂.
Crabro dubius Smith, Cat. Hym. Brit. Mus. iv, p. 417.
Crabro confluentus Smith, ibid. p. 420.
Crabro interruptus Packard, Proc. Ent. Soc. Phila. vi. p. 74, ♂ ♀.

♀.—Head covered with coarse, separated, deep punctures, those between the ocelli and occiput scarcely less coarse or closer than those of the front, the cheeks also coarsely punctured; pronotum not remarkably large, the lateral tooth small; scutellum marked by large punctures in addition to the striæ; middle segment as described in *cinctellus*. Abdomen with strong, separated punctures, but less coarse than those of the head. Black; scape, pedicellum, spots on pronotum narrowly separated, tubercles, line on scutellum and metanotum, that on the former sometimes wanting, apex of femora, tibiæ (sometimes darker internally), tarsi (apical joints darker), an elongate, narrow spot on each side of dorsal segments 1–4, that on segment 1 more or less sinuated, and a shorter and broader spot on each side

of segment 5, yellow; no yellow on mesopleurae or ventral segments of abdomen; pubescence of face and clypeus silvery. Wings subhyaline, somewhat darker apically, nervures and stigma testaceous. Length 8–11 mm.

♂.—Coarsely sculptured like the female, but more strongly so; flagellum subclavate, not widened basally; pronotum rather strongly dentate laterally; middle segment very coarsely rugose, particularly above, the sides with coarse, more or less irregular striations. Abdomen with one, more rarely with two or three terminal bands. Length 8–10 mm.

Occurs from Canada to Florida (Ashmead); Illinois; Nebraska (Barber); Colorado; Montana. Probably our most common species, and subject to some variation: the spots on pronotum are sometimes wanting and the femora are rarely yellow in greater part. A female specimen from District of Columbia (Ashmead) has the pronotum scarcely dentate as in *producticollis*, but is too coarsely sculptured for that species. The smooth bodied specimen mentioned by Packard is evidently a female of *producticollis* (= *4-maculatus* Prov.).

3. **Crabro bellus** Cress.

Crabro bellus Cresson, Proc. Ent. Soc. Phila., iv, p. 481, ♀.
Crabro atrifrons Cresson, ibid. p. 183, ♂.

♀.—Head with strong punctures, those between the ocelli and occiput, however, close and confluent, those on the front large and sparse; thorax as in *interruptus*, but a little less coarsely sculptured; abdomen distinctly punctured, but more finely and closely punctured than in *interruptus*. Black; scape, pedicellum, two spots on pronotum, sometimes wanting, tubercles, scutellum and metanotum sometimes (usually black, however), tips of femora more or less, tibiæ except dark spot internally, tarsi (apical joints darker), a long, narrow spot on each side of dorsal abdominal segments 1–5, those on segment five nearly always united, and those on segment one sinuous, all yellow; no yellow on mesopleurae or ventral segments of abdomen; pubescence of clypeus silvery; wings subhyaline, rather strongly tinged with yellow basally, particularly along the costa, nervures and stigma yellowish testaceous. Length 9–11 mm.

♂.—This sex differs from *interruptus* in the same characters as does the ♀: the finer sculpture and in possessing one or two more terminal bands on abdomen; wings darker than in the ♀, and not yellowish; pronotum with a large tooth laterally. Length 6–8.5 mm.

Colorado; Nevada; Mt. Hood, Oregon; Washington. Very close to *interruptus*, but more finely sculptured, and the spots on abdominal segments 4 and 5, at least on 5, united. The thorax is usually sparsely spotted in both sexes, while in *interruptus* the usual markings are present; this is, however, variable in both species. The width of the clypeal production varies and the medial lobe is often armed with a strong tooth on each side of the medial process; this character occurs also in the other species of the group but is less developed.

4. **Crabro producticollis** Pack.

Crabro producticollis Packard, Proc. Ent. Soc. Phila., vi, p. 76, ♂.
Crabro 4-punctatus Provancher, Hym. Quebec, p. 653.
Crabro 4-maculatus Provancher (non Fabr.), ibid. p. 655, ♀.

♀.—Head covered with strong, even, distinctly separated punctures, sparse on the cheeks and large and deep on the front; pronotum not so sharply margined as usual, the lateral tooth extremely small; thorax, perhaps, a little less coarsely sculptured than in the allied species; middle segment somewhat rugose, but not coarsely, the not strongly, sometimes indistinctly striated, longitudinal central furrow of upper surface rather broad, and the transverse series of foveæ well marked; abdomen finely and closely, though distinctly punctured, strongly glabrous in comparison to the other species of the group. Black; scape, pedicellum more or less, two spots on pronotum, tubercles, scutellum more or less (rarely black), tips of femora, tibiæ, sometimes dark internally, tarsi (apical joints darker) and a spot on each side of dorsal abdominal segments 2–5, widely separated, and sometimes a much smaller spot on each side of segment 1, yellow; pubescence of clypeus silvery; wings subhyaline, but little darker apically. Length 8–11.5 mm.

♂.—Head with coarse punctures, those between the ocelli and occiput confluent; cheeks very sparsely punctured, polished; flagellum distinctly widened near the base; space between eyes at base of clypeus distinctly less than that between the hind ocelli, and less than in the allied species; thorax very coarsely sculptured, scutellum longitudinally rugose; middle segment covered with coarse rugæ, the sides coarsely striated; fore femora with lower margin strongly angular just beyond the middle, toothed near the base as usual; first joint of medial tarsi more strongly sinuous than in ♂ of *interruptus* and *bellus;* abdomen but little more strongly punctured than in the female; colored like the ♀, except that the scape is dark posteriorly, the thorax excepting the tubercles is rarely maculated, the spots on abdomen are longer and narrower and those on segments 5 and 6 form usually though not always, bands. Length 6–8.5 mm.

Canada (Harrington); New Hampshire (Mrs. Slosson); New York; New Jersey; Illinois (Nason); Texas; Washington; Vancouver. A specimen from Illinois is more strongly sculptured than usual, but still retains the shiny appearance, particularly of the abdomen, which is a good superficial character in this species. Provancher's *C. 4-punctatus*, which the same author calls *4-maculatus* on p. 655 of his work, I unite with this species, as it is evidently the female. This latter sex has also been given the name *aciculatus* Cress. non Prov.), but Cresson never published a description of it.

2. Group *montanus*.

Differing from the preceding group by the less coarsely sculptured bodies, the abdomen being very finely punctured. The dorsulum is closely and not very coarsely striato-punctate, tending in the males to rugose. Medial production of clypeus shorter and broader than

in group *confluentus*, Flagellum of ♂ with the first four joints strongly contracted basally and produced at apex, the first and fourth joints most strongly; fore femora (♂) beneath at the base somewhat enlarged, the fore tarsi are strongly flattened and broadened, the first joint of medial tarsi variable in length and shape, but never sinuous.

5. **Crabro montanus** Cress.

Crabro montanus Cresson, Proc. Ent. Soc. Phila., iv, p. 484, ♀.
Crabro cristatus Packard, ibid. vi, p. 101, ♂.
Crabro cubiceps Packard (non Tasch.), ibid. p. 105, ♀.
Crabro effosus Provancher (non Pack.), Hym. Quebec, p. 660, ♂ (non ♀).

♀.—Space between eyes at base of clypeus about equal to the combined length of joints of joints 1 and 2 of the flagellum; pronotum sharply margined anteriorly, distinctly furrowed in a transverse manner, with a rather large, sharp lateral tooth; dorsulum tolerably strongly striato-punctate on anterior portion, posteriorly with separated punctures; scutellum sparsely punctured, striated behind, mesopleurae rather strongly striated; upper surface of middle segment separated from the posterior face by a tolerably strong ridge, with strong, somewhat irregular, but tolerably longitudinal, striae, the medial furrow not broad, posterior face finely punctured, apically with some coarse, transverse striae, not ridged laterally, sides delicately striated; abdomen very finely punctured, the second ventral segment with large, sparse punctures. Black; mandibles basally, more or less, greater part of scape, sometimes entirely, two spots on pronotum, tubercles, scutellum and metanotum in part very rarely, a small spot at tip of fore and medial femora sometimes, tibiae externally more or less, and a spot at each side of dorsal abdominal segments 1–5, yellow or whitish yellow, the spots on segment 1 very small and sometimes wanting, those on segment 2 largest, those on segment 5 more rounded and never uniting; tarsi black or dark testaceous. Length 7–10 mm.

♂.—Head rather strongly and closely punctured, the space between the eyes at base of clypeus greater than in the ♀, but not greater than the combined length of flagellum joints 1 and 2, as those joints are longer in the ♂ than in the ♀; space between hind ocelli distinctly less than that between them and nearest eye-margin; head strongly margined posteriorly; pronotum large, very strongly crested anteriorly, the lateral tooth large and sharp; dorsulum coarsely rugose, irregularly so on anterior portion, longitudinally posteriorly; middle segment more coarsely sculptured above than in the ♀, the posterior face coarsely transversely striated throughout, the sides coarsely striated also; first joint of medial tarsi shorter than the three following joints united, distinctly dilated a little beyond the middle, but again narrowed to apex, second joint strongly curved and produced at apex within; abdomen somewhat more distinctly punctured than in the ♀; colored and marked as in that sex, but differing in the following points: metanotum yellow, fore femora with a yellow streak posteriorly, anteriorly more or less reddish yellow, markings of the abdomen larger, more approximate, the fifth and sixth segments banded. Length 6–7 mm.

Canada to New York; Illinois; Michigan (Davis); South Dakota (Aldrich); Colorado; Nevada; Mt. Hood, Oregon; Washing-

ton. *C. cubiceps*, I unite with *montanus* as it differs only in the color of the scape, a trivial character and in this species a variable one. *C. cristatus* is without doubt the male of *montanus*. I have examined over eighty specimens of this species mostly from the West which indicates a common occurrence.

6. **Crabro atriceps** Cress.

Crabro atriceps Cresson, l. c., p. 483, ♀.

♀.—Space between the eyes at base of clypeus fully equal to the length of joints 1 and 2 of the flagellum; pronotum not margined, the lateral tooth small and blunt, transverse furrow indistinct; dorsulum anteriorly with very close punctures, indistinctly interspersed with striæ, posteriorly the punctures less close; mesopleuræ rather coarsely and closely striated; middle segment with the ridge separating the upper surface from the posterior face indistinct, medial furrow broad, distinctly widened at the middle, posterior face finely roughened or rugose, without transverse striæ apically and not ridged laterally, sides delicately striated; abdomen finely punctured, but more distinctly than in *montanus*. Black, including the mandibles and scape; two spots on pronotum, tubercles, line on metanotum, sometimes broken, or absent, spot at the apex of the four anterior femora, sometimes wanting, a line on the outer side of tibiæ, and an elongated spot on each side of dorsal abdominal segments 2–5, those on segment 5 always united, yellow; no spots on the first segment; the tarsi black; wings subhyaline throughout. Length 7–9 mm.

♂.—Head with tolerably fine and close punctures, the hind margin not strongly margined; space between the hind ocelli scarcely less than that between them and the nearest eye-margin; pronotum larger than in the ♀, but smaller than in the ♂ of *montanus*, not very strongly crested and the lateral tooth short; central furrow of medial segment even broader than in the female, the posterior face with rather coarse transverse striations, sides strongly striated; first joint of medial tarsi about as long as the three following united, but slightly dilated medially, the apex a little produced within, second joint strongly curved and produced at apex within; abdomen distinctly punctured; colored and marked as in the ♀, the abdominal markings, however, longer, narrow and more sinuous, and those on segment four almost united. Length 7 mm.

Colorado. The uniting of the spots on fifth abdominal segment and black color of scape are good superficial characters in separating this from *montanus*. A ♂ specimen from Nevada, I refer with some doubt to this species; the abdominal spots are small and consequently widely separated and the pronotum appears more sharply dentate.

7. **Crabro brunneipes** Pack.

Crabro brunneipes Packard, l. c., p. 102, ♂.

♀.—Space between the eyes at base of clypeus about equal to the length of joints 1 and 2 of the flagellum; pronotum margined, but not strongly so, the lateral tooth small, transverse furrow distinct though narrow; dorsulum anteriorly rugoso-punctate, posteriorly with strong separated punctures, those on the scutellum sparser; mesopleuræ coarsely striated; middle segment with the ridge

separating the upper surface from the posterior face well developed, medial furrow broadened, widened medially, upper surface much more coarsely striated than in *atriceps* and the striæ fewer, posterior face finely rugose, distinctly ridged laterally, sides rather indistinctly striated; abdomen more finely punctured than in *atriceps*. Black, including the mandibles; scape more or less, two small spots, widely separated, on pronotum, tubercles, metanotum, spot on fore and medial femora at apex, sometimes lacking, tibiæ externally, sometimes the hind pair in greater part, a large spot on each side of dorsal abdominal segments 2–5, more or less pointed internally, except those on the fifth, which are truncate and always separated, yellow; tarsi black, wings pale fusco-hyaline, nervures and stigma black. Length 6.5–8 mm.

♂.—Head finely and closely punctured, the hind margin tolerably well margined; space between hind ocelli apparently slightly greater than that between them and the nearest eye-margin; middle segment above coarsely rugose, posterior face with somewhat irregular, coarse, transverse striations, the lateral ridges present but imperfectly developed, sides strongly striated; first joint of medial tarsi about as long as the three following united, less dilated medially than in *atriceps*, second joint curved and produced at apex; abdomen punctured as in the female; colored and marked like the female, the spots on pronotum sometimes absent, those on the abdomen smaller than in the other sex and always widely separated. Length 6–7 mm.

Maine; New Hampshire; Pennsylvania; Illinois (Robertson); South Dakota (Aldrich). The separated spots on fifth abdominal segment, coarser sculpture and darker wings are points in which this species differs from *atriceps*.

8. **Crabro corrugatus** Pack.

Crabro corrugatus Packard, l. c., p. 107, ♀.

♀.—Space between eyes at base of clypeus somewhat less than the combined length of flagellum joints 1 and 2, the space between hind ocelli slightly greater that between them and the nearest eye-margin; pronotum with the transverse impression broad, especially toward the sides, sides not deep, the lateral tooth small and blunt; dorsulum finely striato-punctate, most closely anteriorly, scutellum more coarsely so; mesopleuræ finely striato-punctate, more finely than the posterior portion of the dorsulum; middle segment above covered with very coarse, irregular folds or rugæ, whose strength varies, posterior face tolerably well enclosed by a surrounding ridge, with coarse, transverse striations on apical portion, sides finely, though distinctly striated; abdomen very finely and closely punctured. Black; large spot on mandibles basally, scape entirely or in part, large spots on pronotum, tubercles, metanotum, tips of femora more or less, tibiæ entirely or spotted internally, sometimes the first tarsal joint in part, and large spot at each side of dorsal abdominal segments 2–5, those on the latter separated sometimes very nearly united, though usually well separated, yellow; tarsi testaceous; wings subhyaline, a little darker apically, nervures and stigma testaceous. Length 6–7 mm.

♂.—Head strongly and sharply margined posteriorly; pronotum broadly furrowed as in the ♀; middle segment with the ridge enclosing posterior face very strong, the latter with coarse, transverse striations throughout, sides rather

coarsely striated; first joint of medial tarsi longer than the three following joints united, the second joint as usual, strongly produced at apex; colored and marked like the ♀, the fore femora, however, streaked with yellow posteriorly and reddish yellow, in front; spots on abdomen smaller and widely separated. Length 5 mm.

Canada (Harrington); New York; Virginia. The width of the space between eyes at base of clypeus, broad impression of pronotum, distinctly striated scutellum, finer sculpture of dorsulum, etc., distinguish this species from the preceding ones.

9. **Crabro parvulus** Pack.

Crabro parvulus Packard, l. c., p. 108, ♀.

♀.—Space between the eyes at base of clypeus but little less than the length of flagellum joints 1 and 2 united, the space between the hind ocelli somewhat greater than that between them and nearest eye-margin; transverse furrow of pronotum not very broad, but deep; dorsulum finely striato-punctate; scutellum sparsely punctured, the striæ confined to the sides and posterior portion; middle segment above with strong, but not coarse, oblique striæ, posterior face not distinctly enclosed, the surrounding ridge weak, with coarse transverse striations on apical portion, sides delicately striated; abdomen finely and closely punctured. Black, the thorax except tubercles, rarely spotted; spot on mandibles basally, scape in part, tubercles, spots on pronotum and metanotum rarely, tips of fore and medial femora slightly, sometimes, line on tibiæ externally, and a spot at each side of dorsal abdominal segments 2–5, all widely separated, yellowish; tarsi testaceous; wings subhyaline, nervures and stigma testaceous. Length 6–7 mm.

♂.—Occiput distinctly, though not very strongly margined posteriorly; pronotum furrowed as in the ♀; dorsulum punctato-striate; scutellum striato-punctate throughout; middle segment much more coarsely striated than in the ♀, particularly above and on the sides, the posterior face covered with coarse, transverse striæ, distinctly enclosed, the surrounding ridge, however, less strongly developed than in the ♂ of *corrugatus;* first joint of medial tarsi distinctly longer than the three following united, the second joint curved and produced as usual; mandibles, and much the greater part of medial and hind tibiæ black; thorax, except tubercles, very rarely maculated; abdominal markings smaller than in the ♀; fore femora with a line posteriorly, yellow. Length 5–6 mm.

South Dakota (Aldrich); Colorado; Nevada; Mt. Hood, Oregon; Washington. Distinguished from *corrugatus* by the differently furrowed pronotum, finer sculpture of middle segment, color of tibiæ and rarely maculated thorax. The head is more closely punctured in the ♂ in this species than in *corrugatus* and *pauper*.

10. **Crabro pauper** Pack.

Crabro pauper Packard, l. c., p. 95, ♂.

♂.—Joints 1–3 of flagellum more strongly produced beneath than in the other species of the group; occiput distinctly, though not very strongly margined posteriorly, less strongly than the cheeks; transverse furrow of pronotum broader than in *parvulus*, narrower than in *corrugatus;* dorsulum and scutellum rather

finely striato-punctate throughout; middle segment above coarsely and irregularly rugulose, posterior with coarse transverse striations, tolerably well enclosed, the surrounding ridge, however, not as well developed as in *corrugatus* ♂; first joint of medial tarsi not much longer than the following three united, the second joint as usual; abdomen longer than the head and thorax, finely and closely punctured. Black, including the mandibles; scape in part, two spots on pronotum, tubercles, line on metanotum, sometimes wanting, greater part of anterior portion of femora, and a line posteriorly, tips of medial pair, tibiæ except a variable spot internally, and a spot on each side of dorsal abdominal segments 2 6, yellow. Length 7 mm.

Maine (Packard); Virginia. In the more strongly produced basal joints of the flagellum this species approaches those of the following group. It is a more elongate species than *corrugatus*, and the enclosing ridge of posterior face is feebler.

3. Group *nigrifrons*.

Body finely sculptured, particularly the abdomen, which is indistinctly punctured; dorsulum finely and closely striato-punctate, tending to closely punctured in the males; mesopleuræ delicately and closely striated; medial production of clypeus distinct, in the males more so than in those of the preceding group; flagellum of ♂ with joints 1 and 2, or 1–4 very strongly produced or toothed beneath, joints 1 and 2 solidified forming one long joint; fore femora (♂) not enlarged or produced at the base beneath, fore tarsi not flattened, the first joint of medial tarsi armed within near the apex with a tooth or spine; last dorsal segment (♂) not furrowed as usual; pubescence of front and clypeus (♀) golden, silvery in the males.

11. **Crabro obscurus** Sm.

Crabro obscurus Smith, Cat. Hym. Brit. Mus., iv, p. 418, ♀ ♂.
Crabro denticulatus Packard, l. c., p. 97, ♂.
Crabro obscurus Packard, ibid. p. 99, ♀.
Crabro effosus Packard, ibid. p. 104, ♂.
Crabro effosus Provancher, Hym. Queb., p. 660, ♀ (non ♂).

♀.—Head finely and closely punctured, first joint of flagellum fully as long as the three following united; space between hind ocelli about equal to that between them and nearest eye-margin; dorsulum finely and closely striato-punctate, the scutellum more sparsely so; mesopleuræ more distinctly striated than the dorsulum; upper surface of middle segment with coarse, somewhat oblique striations and separated from the posterior face by a series of strong, transverse fovea, its central furrow broad and transversely ridged, posterior face finely rugose, transversely and more coarsely so on apical portion, rather distinctly ridged laterally, sides with tolerably coarse striations. Black; large spot on mandibles, scape entirely, base of pedicellum, two spots on pronotum, tubercles, metanotum, scutellum

sometimes, tips of fore and medial femora, tibiæ, except apex of hind pair and an inconstant dark spot on other pairs, tarsi (apical joints darker) and a long, narrow, somewhat sinuous spot on dorsal abdominal segments 2–5, yellow, the spots on segment five usually united; first segment rarely spotted, tegulæ entirely testaceous. Length 8–9 mm.

♂.—First two joints of flagellum strongly dentate beneath, the third and fourth joints indistinctly so, the combined length of joints 1 and 2 as great as that of the following four joints united; head more strongly punctured than in the female; dorsulum closely and rather strongly punctured, somewhat granular in appearance; middle segment sculptured as in the ♀, but more coarsely, in some specimens the upper and posterior faces are coarsely rugose, central furrow variable, in some specimens absent, or indistinct; marked and colored about as in the ♀, the pedicellum and mandibles black. Length 6–7 mm.

Hudson Bay (Smith); Canada; New Hampshire; Connecticut (Norton); New York; New Jersey; Pennsylvania; District of Columbia; Virginia; Louisiana; Illinois and Michigan (Gillette). Three females I refer here with some doubt; they are smaller 6–7 mm., and the space between the hind ocelli distinctly greater than that between them and nearest eye-margin. The *C. obscurus* described by Provancher is evidently a ♂ *chrysargimus;* and the ♂ described by the same author under the name *effosus* I take to be ♂ of *montanus* (= *cristatus*). Packard's *denticulatus* is evidently the ♂ of *obscurus*, and his *effosus* simply an abnormal form of the first mentioned species.

12. **Crabro gracilissimus** Pack.

Crabro contiguus Cresson (in part), l. c., p. 484, ♀.

Crabro gracilissimus Packard, l. c., p. 78, ♂.

♀.—Differs from that of *obscurus* as follows: dorsulum and scutellum a little more strongly sculptured; mesopleuræ less finely striated; upper surface of middle segment with distinct, though not coarse, irregular striations, not separated from the posterior face by foveæ, lateral ridges of posterior face feebly ridged, sides finely striated; colored similarly to *obscurus*, the metanotal spot usually wanting, although sometimes present; abdominal spots variable, all united or nearly so in some individuals and others with the first segment maculated; tegulæ with a yellow dot anteriorly; pedicellum entirely black. Length 8–11 mm.

♂.—This sex is very close to that of *obscurus:* the sculpture of middle segment is not so coarse, the transverse series of foveæ separating the upper surface from the posterior face is narrower and not quite so strong, and the lateral ridges of posterior face are scarcely developed; the abdominal markings vary as in the ♀, and the spot on the tegulæ is not always present. Length 6–8 mm.

South Dakota (Aldrich); Colorado; Nevada; California; Mt. Hood, Oregon; Washington. The color of the markings varies from pale to deep yellow. Cresson confused the female of this species with *C. contiguus;* this is shown by the types of that species.

13. **Crabro nigrifrons** Cress.

Crabro advena (in part) Smith, Cat. Hym. Brit. Mus., iv, 421, ♂ (non ♀).
Crabro nigrifrons Cresson, Proc. Ent. Soc. Phila., iv, 482, ♂.
Crabro contiguus Cresson, ibid. p. 484, ♀

♀.—Head finely and closely punctured; first joint of flagellum scarcely as long as the three following ones united; frontal impressed line distinct; dorsulum and scutellum finely and closely striato-punctate; mesopleuræ very finely and closely striated, rather subtilely so; middle segment above with not very strong longitudinal striations, the central furrow long and narrow, upper surface not separated from posterior face by foveæ, posterior face delicately and transversely striated, without any trace of lateral ridges, sides delicately striated. Black; large spot on mandibles, scape entirely, pedicellum in part, two variable spots on pronotum, tubercles, spot on scutellum and metanotum sometimes, although these parts usually not spotted, tips of fore and medial femora more or less, and tips of hind pair sometimes, tibiæ except a dark spot internally, tarsi except apical joints and a long narrow spot on each side of dorsal abdominal segments 2–4, those on segment 4 united, yellow; the abdominal spots in rare cases, all united in bands, or nearly so, in which event the spots are broader and the first segment spotted; tegulæ entirely testaceous. Length 11–12 mm.

♂.—First four joints of flagellum armed with a large tooth beneath, the combined length of the first two joints not greater than the length of the following three joints united; dorsulum more strongly sculptured than in the ♀, appearing granulated anteriorly; middle segment with the sculpture coarser than in the other sex, central furrow broader, and the upper and posterior faces separated by foveæ, posterior face rather coarsely and transversely striated, and with poorly developed lateral ridges, sides not so coarsely striated as the posterior face; first joint of medial tarsi more strongly toothed or spined internally than in *obscurus* and *gracilissimus*. Black, including the mandibles; scape with a black spot posteriorly; thorax marked as in the ♀: fore femora and tibiæ in front and the medial femora in part, rufous, the femora (except the hind pair) otherwise black and yellow; medial and hind tibiæ yellow externally, black within; flagellum beneath, tegulæ entirely and tarsi, except anteriors, testaceous; abdominal spots as in the ♀, but of course an additional pair, and the first segment spotted. Length 9–11 mm.

Occurs from Canada to New York, westward to California and Washington; Colorado; Nevada. The ♀ specimens having the abdominal spots united into bands have a yellow spot on the episternum mesopleuralis, not evident in the other forms; they are from California and Nevada.

4. Group *sexmaculatus*.

The three species contained in this group differ from all those preceding by the medial portion of clypeus being rounded anteriorly, and not produced into a truncated process; abdomen indistinctly punctured or impunctate; pygidium with a lateral fringe of long, thick hair; mesopleuræ rather coarsely striato-punctate; flagellum

of males with the fourth joint strongly emarginate beneath; fore tarsi (♂) distinctly flattened, and first joint of medial tarsi at the most strongly produced at apex within.

14. **Crabro sexmaculatus** Say.

Crabro 6-maculatus Say, Keating's Narr. Exp. St. Peter's River, ii, Appendix, p. 341, ♀.

Crabro sexmaculatus Packard, l. c., p. 91, ♀ ♂.

♀.—Head with distinct punctures, closest anteriorly, tolerably well separated behind the ocelli; space between the hind ocelli about equal to that between them and the nearest eye-margin; lateral tooth of pronotum small, indistinct; dorsulum rather coarsely and closely punctured, the punctures on posterior portion but little or not at all sparser than those on anterior; punctures of scutellum sparser; mesopleuræ coarsely striato-punctate; middle segment above and posteriorly with tolerably fine striæ, sides delicately striated, no trace of foveæ between the upper and posterior faces, the latter not at all ridged at the sides. Black; spot on mandibles, scape entirely or in part, two variable spots on pronotum, tubercles, line on metanotum, scutellum in part sometimes, tips of femora in some cases, tibiæ except a spot within, first joint of tarsi, an elongated spot on each side of dorsal segments 2, 4 and 5, the third segment sometimes spotted and in some specimens the spots on segment 5 are united, yellow or pale yellow; size of spots on third segment, when present, variable; head, thorax and first segment of abdomen with tolerably long and conspicuous pubescence; wings subhyaline, somewhat darker apically. Length 9–12 mm.

♂.—More coarsely sculptured than in the ♀; first joint of flagellum distinctly longer than the second; middle segment with the upper surface and posterior face separated by distinct foveæ, posterior face transversely rugose, the lateral ridges indistinct, but bounded outwardly by a foveolated furrow; first and second joints of medial tarsi strongly produced at apex within, almost spinose; colored and marked like the ♀, with the following additions: fore femora and tibiæ reddish anteriorly, otherwise yellow and black; first abdominal segment sometimes spotted and with the spots on the other segments are in some cases united. Length 8–10 mm.

Occurs from Canada to Delaware (Packard), westward to California and Washington, and is, perhaps, our commonest species. Say mentions a yellow spot as occurring on the pleuræ beneath the wings; this is not present in any of the 59 ♀ specimens before me; a large series of the ♂ also fails to disclose it. It may be that this is not Say's species, but his description is too insufficient to reach a decision.

15. **Crabro trifasciatus** Say.

Crabro trifasciatus Say, Keating's Narr. Exp. St. Peter's River, ii, Appendix, p. 342.

Crabro trifasciatus Packard, l. c., p. 93, ♂ ♀.

♀.—Very close to *sexmaculatus*, though somewhat smaller; punctures of dorsulum tolerably well separated on posterior portion; upper surface of middle segment separated from the posterior face by a rather distinct series of foveæ,

rather strongly striato-punctate, posterior face rugose, indistinctly ridged laterally, sides finely striated; colored and marked as in *sexmaculatus*, but apparently not subject to such variation of the abdominal markings; third segment spotted usually, more rarely immaculate. Length 8–9 mm.

♂.—First joint of flagellum but little longer than the second; middle segment coarsely rugose, particularly above, the transverse series of foveæ separating the upper surface from posterior face stronger than in the ♀; first and second joints of medial tarsi scarcely produced at apex within; colored and marked like the ♀; fore and medial femora black and yellow, not or very obscurely, reddish; abdomen usually with three terminal bands, the third segment always spotted. Length 6–9 mm.

Canada; Maine (Packard); Massachusetts; New Hampshire; New York; New Jersey; Custer, South Dakota (Aldrich); Colorado. The ♂ resembles greatly that of *C. odyneroides*, but the abdomen is indistinctly punctured.

16. **Crabro paucimaculatus** Pack.

Crabro paucimaculatus Packard, Proc. Ent. Soc. Phila., iv, p. 90. ♀.

♀.—Head above with tolerably fine, even punctures, closer in front; space between hind ocelli about equal to that between them and nearest eye-margin; pronotum not dentate laterally; dorsulum closely and rugosely punctured, posteriorly, however, a little less strongly; scutellum with strong, separated punctures; mesopleuræ rugoso-striate; middle segment rugoso-punctate, more rugose on posterior face, the latter ridged at the sides, but not strongly, and separated from the upper surface by a tolerably distinct ridge, which is not, however, always present, sides finely striated; first abdominal segment narrower than in *sexmaculatus* and *trifasciatus*. Black; mandibles except apex, scape in part, two spots on pronotum, sometimes wanting, tubercles, variable spot on metanotum, fore and medial tibiæ externally, hind pair except a spot within and at apex outwardly, basal portion of first joint of fore and medial tarsi sometimes, a short, more or less ovate spot at each side of dorsal segments 2 and 4 and dot on segment 5 laterally, yellow; tarsi and tegulæ blackish; wings fusco-hyaline, paler basally, nervures and stigma black; head, thorax and first segment of abdomen not conspicuously hirsute. Length 7–8 mm.

Illinois; New Jersey in July; District of Columbia; Jacksonville, Florida (Ashmead). This species approaches the following group by the paucity of hair on the pygidial segment. The abdomen is indistinctly punctured, however.

5. Group *scaber*.

The species forming this group are distinguished by the distinctly punctured abdomen, particularly the first segment, and by the females lacking the coarse lateral fringe of hair on pygidial segment. Male with the flagellum as in *sexmaculatus* group; fore tarsi not flattened; middle segment, at least the posterior face, in ♂, laterally, with strong foveæ, differing in this respect from the males of group *chrys-*

arginus. Head in both sexes with strong, separated punctures, except in one case; sculpture of thorax in both sexes coarser than in the allied groups.

17. **Crabro stirpicolus** Pack.

Crabro stirpicola Packard, l. c., p. 111, ♂ ♀.

♀.—Head with tolerably strong, separated punctures, close on the front, however; pronotum indistinctly dentate at the sides; dorsulum rugoso-punctate anteriorly, on posterior portion the punctures well separated; scutellum with large, separated punctures; mesopleuræ with large, scattered punctures, interspersed with coarse striæ; middle segment above and behind coarsely striated, posterior face with lateral ridges scarcely developed, sides indistinctly striated. Black; spot on mandibles, scape, two spots on pronotum, tubercles, episternum mesopleuralis in part sometimes, line on scutellum and metanotum either or both of which may be entirely black, tips of femora, tibiæ entirely, or with a dark spot within, basal joint of tarsi and an elongated spot on each side of dorsal abdominal segments 2, 4 and 5, yellow; third segment sometimes spotted, and in one specimen the second segment only is spotted; apical tarsal joints testaceous; wings dark subhyaline, paler basally. Length 5–7 mm.

♂.—Head more strongly punctured than in the female; pronotum indistinctly dentate at the sides; dorsulum and mesopleuræ more coarsely sculptured than in the female; middle segment above coarsely rugose, less so on posterior face, the latter separated from the upper surface by a distinct ridge, and ridged indistinctly at the sides, sides strongly striated; colored and marked as in the ♀. Length 5–6 mm.

Canada (Provancher); New York; New Jersey in August; Illinois; Michigan (Davis); West Point, Nebraska (Barber); Texas. It is said to make its nests in the stems of raspberry.

18. **Crabro spiniferus** n. sp.

♀.—Head rather finely and closely punctured, more so in front, very strongly margined posteriorly; pronotum armed with a long, sharp, tooth or spine on each side; dorsulum coarsely punctured, closely so on anterior portion, posteriorly the punctures separated; scutellum with large, sparse punctures; mesopleuræ coarsely and closely striato-punctate; middle segment closely striato-punctate above and behind, much less coarsely so than the mesopleuræ, posterior face with lateral ridges wanting, sides delicately striated; abdomen closely and rather finely, though distinctly punctured. Black; large spot on mandibles, scape except a spot posteriorly, pronotum, slightly interrupted medially, tubercles, line on scutellum and metanotum, either of which or both may be wanting, tips of femora more or less, tibiæ except a line within and apex of hind pair, first joint of tarsi except apex, and a large spot at each side of dorsal abdominal segments 2–5, yellow; apical tarsal joints blackish; wings subhyaline, paler basally. Length 7–8 mm.

♂.—Head closely punctured, but a little more strongly than in the ♀; pronotum strongly crested, sharply spinose laterally; middle segment with the upper surface separated from the posterior face by a series of strong foveæ, posterior face transversely rugose, indistinctly ridged laterally, sides strongly striated; colored and marked as in the ♀, except that the scutellum and metanotum are rarely spotted and the abdominal markings longer and narrower. Length 6–7 mm.

Washington; Southern California (O. B. Johnson and D. W. Coquillett); Nevada; Arizona; Colorado. Easily distinguished by the strong spine with which the pronotum is armed on each side.

19. **Crabro rufipes** St. F. et Br.

Ceratocolus rufipes St. Farg. et Brullé, Ann. Soc. Ent. Fr. iii (1834), p. 741, ♀.
Crabro rufipes Smith, Cat. Hym. Brit. Mus., iv, p. 418.
Crabro excavatus Fox, Ent. News, iii, p. 10, ♀ ♂.

♀.—Head with large, separated punctures, closer in front; space between the eyes at base of clypeus somewhat less than the width of the latter in the middle; space between hind ocelli about equal to or slightly greater than that between them and the nearest eye-margin; pronotum not dentate laterally; dorsulum rugosely punctured, sparsest posteriorly; mesopleuræ not as coarsely striato-punctate as in *scaber;* middle segment above coarsely and closely punctured, posteriorly more or less rugose, sides coriaceous, indistinctly striated; first and second dorsal segments with large, separated punctures, those on the first strongest, the punctures finer and closer on the other segments; second ventral segment with the punctures less scattered and not as strong as in *scaber*. Black; mandibles except apex, scape, pedicellum, first joint of flagellum more or less, pronotum narrowly interrupted medially, tubercles, episternum mesopleuralis in part, scutellum, metanotum, fore and medial femora and tibiæ in part sometimes, and a spot at each side of dorsal abdominal segments 1–5, yellow; the abdominal spots variable: that on the first segment sometimes wanting and the others greatly reduced in size, or the spots on segment 5 may be united into a band; legs in greater part, including the trochanters sometimes, entirely rufous, and the first and second segments of abdomen frequently suffused with that color. Length 8–9 mm.

♂.—Resembles greatly that of *scaber*, but the front is less coarsely and more closely punctured, the punctures being more or less confluent; space between eyes at base of clypeus distinctly greater than the width of the latter in the middle; thorax about as in *scaber;* first joint of medial tarsi not curved; punctures of second ventral segment finer and closer than those of the first dorsal; colored like the ♀. Length 9 mm.

Carolina (St. Fargeau); Georgia; St. Augustine (Johnson) and Jacksonville (Ashmead), Florida. St. Fargeau gives the color of the legs of this species as black, but this must be a mistake, or he would not have named it *rufipes*.

20. **Crabro scaber** St. F. et Br.

Solenius scaber Lepelitier de Saint Fargeau et Brullé, Ann. Soc. Ent. Fr. iii (1834), p. 715, ♂.
Crabro scaber Smith, Cat. Hym. Brit. Mus., iv, p. 418.
Crabro scaber Packard, l. c., p. 114, ♀.

♀.—Head with strong, much separated punctures, closest in front; space between the eyes at base of clypeus equal to the width of the latter in the middle; space between hind ocelli less than that between them and the nearest eye-margin; pronotum distinctly margined above, but very indistinctly dentate at the sides; dorsulum rugosely punctured, sparsest posteriorly; mesopleuræ coarsely striato-punctate; middle segment above coarsely and closely punctured, the posterior

face with coarse rugæ laterally forming large foveæ, which are more evident in some specimens than in others, sides coriaceous; first and second dorsal segments of abdomen with large, separated punctures, those on the first strongest, segments 3–5 with the punctures finer and closer; second ventral with large, scattered punctures. Black; an elongated spot on the mandibles within near the base, scape, pedicellum, and sometimes two or three basal joints of the flagellum, pronotum, tubercles, metanotum, sometimes apex of femora and tibiæ in part, a broad band on dorsal abdominal segment 2, and a much narrower one on segments 3–5, frequently interrupted, broken into spots, or else wanting on one or more segments, yellow; legs, including the trochanters in part or entirely, rufous; wings subfuscous, pale basally. Length 9–10 mm.

♂.—Sculptured like the ♀, but more coarsely, and the front with large separated punctures like the top of head; space between the eyes at base of clypeus slightly less than the width of the latter in the middle; space between hind ocelli about equal to that between them and the nearest eye-margin; pronotum strongly margined, with a large, blunt lateral tooth; middle segment with a transverse series of foveæ separating the upper surface from the posterior face, sides coarsely striated; first joint of medial tarsi rather strongly curved; punctures of second ventral segment finer and closer than those of the first dorsal; colored and marked like the ♀, the first segment sometimes reddish. Length 8 mm.

Philadelphia (Lepelitier); Camden County, New Jersey, in July; Georgia; Texas.

21. **Crabro texanus** Cress.

Crabro texanus Cresson, Trans. Am. Ent. Soc., iv, p. 227, ♀.

♀.—Head with strong, much separated punctures, which are closest in front; frontal impressed line present; space between hind ocelli less than that between them and nearest eye-margin, the space between eyes at base of clypeus at least as great as the width of the latter in the middle; pronotum distinctly keeled above, longer than in *centralis*, and with a small lateral tooth; dorsulum coarsely punctured, rugosely so anteriorly; mesopleuræ rugosely punctato-striate, or rather rugosely punctured, the episternal suture tolerably well foveolated; middle segment rugoso-punctate, on the sides coriaceous; abdomen above with strong, separated punctures, strongest on first segment; second ventral punctured similarly to the first dorsal. Black; large spot on mandibles near base, scape, pedicellum and sometimes part of first joint of flagellum, pronotum, tubercles, scutellum, metanotum, apical third of femora, tibiæ, tarsi, a band on dorsal abdominal segments 2, 4 and 5, and a dot at each side of segment 3, yellow; head above excepting a sparse, erect pubescence, not pilose; wings subfuscous, pale at base. Length 6–7.5 mm.

♂.—Colored and marked like the ♀, which it greatly resembles, but there is no yellow on epistermum mesopleuralis and third dorsal abdominal segment; and in this sex the sculpture is coarser; middle segment with a series of large foveæ dividing the upper surface from posterior face, the sides distinctly striated; space between eyes at base of clypeus distinctly greater than the width of the latter in the middle; first joint of medial tarsi scarcely curved; second ventral abdominal segment more finely and closely punctured than the first dorsal. Length 6 mm.

Texas; Carlinville, Illinois (Robertson).

22. **Crabro centralis** Cam.

Crabro centralis Cameron, Biol. Cent.-Amer., Hym. ii, p. 146. Tab. ix, figs. 6, 6*a*, *b*, ♀ ♂.

♀.—Head with strong, even punctures, which are closest and finer posteriorly, frontal impressed line wanting, space between hind ocelli less than that between them and the nearest eye-margin, the space between eyes at base of clypeus slightly greater than the width of the latter in the middle; pronotum distinctly crested above, armed with a small, though distinct tooth on each side; dorsulum more coarsely punctured than the head, closely so on anterior portion; mesopleuræ coarsely striato-punctate, the episternal suture not distinctly foveolate, being crossed by a few ridges; middle segment above rugoso-punctate, but not very coarsely, the posterior face marked by strong transverse folds or ridges, sides rather strongly striated, less distinctly so medially; first segment of abdomen with large, separated punctures, the second segment more closely and finely punctured, and segments 3–5 even more closely, second ventral with coarse, scattered punctures. Black including the tarsi; small spot on mandibles on inner margin, greater part of scape, pronotum, tubercles, metanotum more or less, a line on outer side of tibiæ, a band on dorsal abdominal segments 2–5, sixth segment entirely, and ventrals 2–5 narrowly at apex, yellow; a rufous streak on hind femora above; head above clothed with a dense, brownish pile; wings subhyaline, darker apically, with a strong yellow streak along the costa; abdomen with silvery sericeous pile. Length 10 mm.

Mexico; Guatemala and Panama (Cameron); Las Cruces, New Mexico (Cockerell). The only specimen before me seems to agree with Cameron's description of *centralis*, but the abdomen is strongly punctured, and not finely as stated by Cameron. However, the meaning of fineness and coarseness is no doubt viewed differently by various authors. I have not seen the ♂, and Cameron does not mention it in his description, although giving figures of the genitalia and antennæ. It is difficult to imagine why that author compares *centralis* to his *guerrerensis*, which, judging from the figure, belongs to a widely separated group.

6. Group *decemmaculatus*.

Distinguished chiefly by the ♂ flagellum being entire, not dentate or emarginate; the fore tarsi are not flattened; abdomen distinctly punctured; pygidium with a distinct lateral fringe; head closely and finely punctured. The females offer no characters by which they may be separated from those of the *chrysargyrus* group.

23. **Crabro decemmaculatus** Say.

Crabro 10-*maculatus* Say, West. Quart. Rep., ii, p. 78; Coupl. Writ. i, p. 167.
Crabro collinus Smith, Cat. Hym. B. M., iv, p. 420, ♂.
Crabro aurifrons Smith, ibid. p. 420, ♀.
Crabro 10-*maculatus* Packard, l. c., p. 79, ♀.
Crabro aurifrons Packard (nec Smith), ibid. p. 80, ♂ (non ♀).

♀.—Head with the punctures distinct, more separated than in *Packardii*: first

joint of flagellum, if anything, slightly shorter than the length of the two following joints united; pronotum not so sharply keeled as in the species mentioned above, the lateral tooth small, scarcely developed; dorsulum with large punctures, sparsest posteriorly; scutellum with large punctures; mesopleuræ strongly punctato-striate, the episternal suture marked by rather strong foveæ; middle segment covered with coarse punctures, sparsest on upper surface, sides indistinctly striated; abdomen distinctly punctured, particularly on the first dorsal segment; ventral segment 2 closely and finely punctured laterally, in the middle with large, sparse punctures. Black; mandibles except apex, scape, pedicellum, base of first joint of flagellum, pronotum, tubercles, episternum mesopleuralis in part (this spot sometimes wanting), scutellum anteriorly and two small spots, one on each side just anterior to it, metanotum, apical portion of femora, tibiæ, tarsi except apical joints, a large spot on each side of dorsal abdominal segments 1–5, those on the fourth and fifth sometimes uniting within, those on segment 2 usually broadest, yellow; basal portion of femora generally reddish, sometimes tending to black, and again the femora are almost entirely reddish; first abdominal segment sometimes more or less rufous; wings subhyaline, darkest apically, on basal portion faintly yellow. Length 13–15 mm.

♂.—Space between eyes at base of clypeus less than the width of the latter in the middle; thorax more coarsely sculptured than in the ♀, particularly the middle segment, which is rugoso-punctate on posterior face, and the sides are coarsely striated; fore trochanters beneath produced into a sharp spine; abdomen more strongly punctured than in ♀; colored and marked like the ♀, but very variable; the yellow is frequently wanting on episternum mesopleuralis and scutellum; the tibiæ and tarsi are sometimes almost entirely reddish, and in one specimen there are no spots on the thorax and abdomen, except on pronotum and tubercles; often the second, or second and third ventral segments have a small lateral yellow spot, and the bands (usually three) on segments 4–6 are sometimes broken. Length 10–12 mm.

Massachusetts (Packard) south to Florida and Texas; Colorado. Smith's *aurifrons* is identical with this species. I also unite the *aurifrons* of Packard with it, the description of which, said to be based on a ♀ agrees with ♂ specimens; thus it seems to me that the unusual form of the ♂ antennæ in this species has deceived Packard, leading him to suppose his specimen was ♀ when really of the other sex. The *aurifrons* and *collinus* are surely synonymous with the above, judging from the descriptions, and this view is strengthened by the fact that Say's 10-*maculatus* is not included in the list of the species published by Smith.

24. **Crabro Packardii** Cress.

Crabro Packardii Cresson, l. c., p. 477, ♀ (non ♂).

♀.—Head finely and closely punctured; space between hind ocelli less than that between them and nearest eye-margin, the space between eyes at base of clypeus somewhat greater than the width of the latter in the middle; first joint of flagellum, if anything, slightly longer than the two following united; pronotum strongly keeled, the lateral tooth not large, though strong and distinct; dorsulum

very closely punctured, more coarsely so than the head; mesopleuræ tolerably coarsely striato-punctate, the episternal suture rather strongly foveolate; middle segment finely striated, delicately so on the sides; abdomen finely punctured, the second ventral with scattered punctures. Black; mandibles except tips, scape, pedicellum beneath and sometimes part of the first joint, pronotum almost entirely above, tubercles, episternum mesopleuralis in part, scutellum anteriorly, two small spots, one on each side just anterior to it, metanotum, an elongato-ovate spot, sometimes wanting, on each side of the middle segment posteriorly, femora except their base and hind portion of posterior pair, tibiæ, tarsi except last two or three joints, two spots on the first dorsal abdominal segment, frequently forming a band, longer spots on second and third segments pointed internally, also united sometimes, a band on segments 4 and 5, a spot on each side of the pygidial segment and the ventral segments to a greater or less degree, bright yellow; pubescence of front and clypeus silvery, with a slight golden tinge in some specimens; wings with a strong yellow tinge on basal two-thirds. Length 11–13 mm.

♂.—Head very closely punctured; space between eyes at base of clypeus distinctly greater than the width of the latter in the middle; thorax more coarsely sculptured than in the ♀, particularly the middle segment, whose upper surface is rugoso-punctate, posterior face strongly punctured, the punctures interspersed with a few striæ, sides coarsely striated; fore trochanters unarmed; abdomen a little more distinctly punctured than in the ♀; marked the same, but in the specimens before me all the dorsal segments are banded, the two apical ones and all the ventrals except the first being entirely yellow; wings yellower and pubescence of front and clypeus golden. Length 11–12 mm.

Colorado; Nevada; California; Mt. Hood, Oregon; Washington. The ♀ can only be distinguished from that of *chrysarginus* by its richer livery and particularly by the ventral segments of abdomen being maculated. The space between the eyes at base of clypeus is somewhat greater in comparison to width of clypeus than in *chrysarginus*, and the form is usually more robust. The yellow on each side of middle segment is peculiar to the species, but cannot be relied on because of inconstancy. The ♂ of this species as described by Cresson is referable to that of *chrysarginus*.

1. Group *chrysarginus*.

The females of this group connot be distinguished from the *decemmaculatus* group. The males differ by the flagellum having the fourth joint emarginate and produced at apex beneath; fore tarsi not distinctly flattened.

25. **Crabro odyneroides** Cress.

Crabro odyneroides Cresson, l. c., p. 481, ♂.

♀.—Head scarcely narrowed posteriorly, rather strongly punctured, very closely so on the front, which appears finely granulated; ocelli forming a low triangle, lower than in *chrysarginus*, the space between the hind pair distinctly less than that between them and the nearest eye-margin; first joint of flagellum

distinctly shorter than the following two united, about one-fourth longer than the second joint; lateral tooth of pronotum small and indistinct; dorsulum compactly punctured or apparently strongly granulated; scutellum with strong, distinct punctures; mesopleuræ strongly punctato-striate, the punctures most prominent, the episternal suture scarcely foveolate; middle segment above with tolerably fine striations, posterior face sculptured somewhat similarly to the mesopleuræ, but more coarsely and the striæ are less evident, sides delicately striated; abdomen distinctly punctured, the first dorsal segment strongly so, the remaining dorsal segments finely and closely; second ventral rather strongly punctured, sparsely in the middle. Black; mandibles except outer margin and apex, scape, two spots on pronotum almost touching internally, tubercles, line on metanotum, extreme tips of fore and medial femora, tibiæ except a line within, tarsi, either entirely or in part, a long narrow mark on each side of dorsal abdominal segment 2, almost touching within, a small spot at each extreme side of segment 3, and a band on segments 4 and 5, that on the fourth sometimes interrupted medially, as are likewise the spots on segment 2 connected, yellow; head and thorax with tolerably dense, grayish hair; wings subhyaline. Length 10–11 mm.

♂.—Head rather coarsely punctured; space between hind ocelli much less than that between them and nearest eye-margin; first joint of flagellum much shorter the combined length of the following two joints united, about one-fourth longer than the second joint, four basal joints together about one-fourth longer than the six terminal ones united; lateral tooth of pronotum stronger than in the ♀, the dorsulum more coarsely sculptured; middle segment above coarsely punctato-striate, the sides more coarsely striated than in the other sex; fore femora beneath at base not produced; first two joints of medial tarsi not curved, only slightly produced apically, the first joint distinctly longer than the three following united; abdomen punctured as in the ♀; colored and spotted the same, sometimes the small spots on segment 3 of abdomen are drawn out and almost touch within, and the lines on segment 2 are unusually united; wings paler. Length 8 mm.

Colorado; Montana.

26. **Crabro imbutus** Fox.

Crabro imbutus Fox, Proc. Calif. Acad. (2), iv, p. 108, ♀.

♀.—Head finely punctured, but more distinctly so than in *chrysargiuus;* frontal impressed line almost obsolete above; ocelli forming a curved line, the space between the hind pair less than that between them and the nearest eye-margin; first joint of flagellum scarcely as long as the two following joints united; pronotum strongly dentate at the sides; dorsulum with strong punctures, those on posterior portion rather well separated, those of the scutellum even more so; mesopleuræ rather coarsely striato-punctate, the episternal suture not foveolate; middle segment rather coarsely striated, the sides delicately so; abdomen with dorsal segments 2–5 finely and closely punctured, the first segment strongly punctured, the abdomen throughout much more distinctly punctured than in *chrysargiuus*. Black; mandibles except apex and outer margin, scape, pedicellum more or less, pronotum entirely, tubercles, episternum mesopleuralis more or less, scutellum in part sometimes, a spot on each side just anterior to it, metanotum, fore femora beneath and sometimes the apex of remaining pairs, tibiæ entirely or in part, basal joints of tarsi, a peculiar, somewhat drepaniform spot on each side of first dorsal abdominal segment, large wedge-shaped marks on second, some-

times connected, thus forming a band, broad band on dorsal segments 3–5, the sixth on each side of pygidium, and a band on ventrals 2–5, that on the second and fifth irregular, bright yellow; legs excepting the coloration noted, reddish, including the trochanters; front and medial part of clypeus with golden pubescence; basal two-thirds of wings yellow, fuscous on remainder. Length 13–14 mm.

♂.—First joint of flagellum not nearly as long as the two following joints united, the four basal joints united about as long as the six terminal ones combined; dorsulum coarsely punctured; middle segment more coarsely striated than in the ♀, particularly the sides; fore femora not at all produced at base beneath; first and second joints of middle tarsi slightly curved, produced at apex, the first somewhat longer than the following two combined; abdomen distinctly punctured, the first dorsal segment strongly so, the second ventral finely and closely; colored like the ♀, except that no spot is present on epimerum mesopleuralis and first abdominal segment, and the band on second segment is sometimes narrower and irregular. Length 11–12 mm.

Lower California; Arizona; Colorado. Easily distinguished by the position of ocelli, sculpture and coloration.

27. **Crabro chrysarginus** St. F. and Br.

Crabro chrysarginus Lepeletier de St. Fargeau et Brullé, Ann. Soc. Ent. Fr., iii, p. 711, ♀.
Crabro arcuatus Say, Bost. Journ. Nat. Hist., i, p. 377.
Crabro chrysargyrus Dahlbohm, Hym. Eur., i, p. 386.
Crabro Packardii Cresson (in pt.), l. c., p. 477.
Crabro honestus Cresson, ibid. p. 485, ♂.
Crabro chrysarginus Packard, l. c., p. 82, ♂ ♀.
Crabro villosifrons Packard, ibid. p. 83, ♀.

♀.—Head very finely and closely punctured; frontal impressed line faint; space between hind ocelli somewhat less than that between them and the nearest eye-margin; first joint of flagellum fully as long as the two following joints united; space between the eyes at the base of clypeus not greater than the width of the latter in the middle; lateral tooth of pronotum rather small; dorsulum compactly punctured, a little more coarsely so than the head, the scutellum somewhat more sparsely; mesopleuræ tolerably coarsely striato-punctate, the punctures more distinct in some specimens than in others, the episternal suture rather strongly foveolate; middle segment finely striated, delicately so on the sides; abdomen dorsally very finely and closely punctured, including the first dorsal segment, the second ventral with larger, scattered punctures. Black; mandibles except apex and outer margin, scape, two spots on pronotum, tubercles, episternum mesopleuralis more or less, scutellum in part or not at all, a spot at each side of it anteriorly, metanotum, femora apically to a greater or less extent, tibiæ entirely or with a dark spot within, tarsi except apical joints, a spot at each side of the first dorsal segment broadest internally, spot at each side of segments 2 and 3, that on the latter segment narrowest, and a band on segments 4 and 5, that on the fourth sometimes broken medially, yellow; silvery pubescence of clypeus sometimes pertaining to golden on medial portion; wings dark subhyaline, nervures and stigma testaceous. Length 11–14 mm.

♂.—Head more distinctly punctured than in the ♀; ocelli forming a low triangle, the space between the hind pair less than that between them and the

nearest eye-margin; first joint of flagellum about as long as the two following joints united, the four basal joints combined nearly twice as long as the six apical joints united; lateral tooth of pronotum stronger than in the female; dorsulum more strongly punctured; middle segment coarsely striated, distinctly so on the sides; fore femora somewhat produced at base beneath; first and second joints of medial tarsi slightly curved and produced at apex, the first joint a little longer than the following two united; punctures of the abdomen distinct, particularly those on the first dorsal segment, the second ventral sparsely punctured; marked similarly to the ♀, except that the scutellum is black and the abdominal markings are narrower; scape sometimes with a black spot; pubescence of front and clypeus silvery; wings paler than in the ♀. Length 8-12 mm.

Occurs from Canada to Florida and through the Western States to Washington, except those in the southwest on the Border. Packard, in his description of the female, states, "second and third joints next to terminal one of flagellum being dentate." This statement is erroneous, as I have examined some of his examples. The fact of the sex being female would discredit his assertion. That author also, on page 84 of his work, in speaking of *arcuatus*, remarks that "Say, in his description, does not mention the sex of the specimens before him, but they must have been ♀." This cannot be, inasmuch as we find the following in Say's description, "sixth joint [of antennæ] arcuated, a little prominent inwardly at tip;" this is distinctly a male characteristic. The males described by Cresson as those of *Packardii* are identical with this species. *C. honestus* Cresson, differs only in lacking the thoracic markings.

8. Group *rufifemur*.

This group is characterized chiefly by the broad, triangular, non-excavated pygidium of the ♀, and by the fore tarsi of the ♂ being flattened and rather broadly dilated. The thorax is coarsely sculptured in both sexes and the abdomen distinctly punctured. In the ♂ the fourth joint of the flagellum curved and has the appearance of being strongly emarginate beneath, this joint is also somewhat produced at apex beneath and the first, second and third joints are more or less contracted basally beneath.

28. **Crabro dilectus** Cress.

Crabro dilectus Cresson, Proc. Ent. Soc. Phila., iv, p. 478. ♀ ♂.

♀.—Head a little more finely and closely punctured than in *bigeminus*, the space between hind ocelli about equal to that between them and the nearest eye-margin; dorsulum rather finely and closely punctured, closer than in *bigeminus;* mesopleuræ coarsely striato-punctate; middle segment rather finely striated above and behind, the sides very delicately striated; abdomen finely and tolerably closely punctured, the first segment most distinctly so; pygidium slightly de-

pressed on apical portion. Black; maculated as in *bigeminus*, but with whitish and each tibia has a dark spot within, the femora are black except their apices, and there are no spots on middle segment; wings subhyaline throughout. Length 11–13 mm.

♂.—Differs from the ♂ of *bigeminus* only in its finer sculpture, particularly of the abdomen, by the pale ornation, the presence of a dark spot on tibiæ within and by dorsal abdominal segments 2–5 having a broad band. Length 7–12 mm.

Colorado; South Dakota (Aldrich); Montana; Washington.

29. **Crabro bigeminus** Patt.

Crabro bigeminus Patton, Can. Ent., xi, p. 213. ♂ ♀.

♀.—Head rather finely punctured, smaller than *rufifemur*, frontal impressed line tolerably distinct; ocelli as usual, the space between the hind pair somewhat less than that between them and the nearest eye-margin; pronotum strongly margined anteriorly, subdentate laterally; dorsulum with rather close, strong punctures, much less coarse than in *rufifemur*, and are most compact anteriorly; scutellum punctured about like the posterior portion of dorsulum; mesopleuræ tolerably coarsely striato-punctate, but less so than in *rufifemur;* mesopleuræ with the medial furrow narrow, not deep, tolerably coarsely striato-punctate, the striæ usually distinct above, and particularly on posterior face, where they are transverse, lateral ridges wanting, sides delicately striated; abdomen distinctly punctured, particularly the first dorsal segment, the second ventral very sparsely punctured; pygidium somewhat longer than in *villosus* and *rufifemur*, slightly depressed on apical portion. Black: mandibles except apex, scape, two large spots on pronotum, tubercles, episternum mesopleuralis more or less, two small spots just anterior to the scutellum, which is rarely colored, metanotum, a large spot on the posterior face of middle segment laterally, extending on the sides somewhat, femora above and beneath on apical portion, tibiæ, tarsi, except one or two apical joints, spots one at each side of abdominal segments 1–3, those on segment 1 shortest, on segment 3 longest and narrowest and pointed within, whereas those on the first two segments are obtuse, and a band on segments 4 and 5, yellow; femora, in part, rufous and black; silvery pubescence on mesosternum rather prominent; wings subhyaline, slightly darker apically, nervures and stigma testaceous. Length 12–14 mm.

♂.—Space between hind ocelli distinctly less than that between them and nearest eye-margin; punctures of head stronger and not as close as in the ♀; pronotum strongly dentate laterally; dorsulum with rather coarse, separated punctures; mesopleuræ coarsely striato-punctate; sides of middle segment strongly striated; first joint of medial tarsi shorter than the following two united, not produced at apex, the outer margin strongly angular, the second joint a little produced at apex and slightly curved; abdomen strongly punctured, particularly the first and second dorsal segments, the remaining dorsal segments more finely and closely punctured; colored like the female, but the femora less black, and the abdominal markings narrower. Length 12 mm.

Massachusetts; Connecticut (Patton); New Jersey; Delaware; Georgia. Distinguished from *rufifemur* by the less coarse sculpture and form of first medial tarsal joint; from *dilectus* it differs by the darker markings, greater extent of yellow and rufous on the femora, coarser sculpture of abdomen, etc.

30. **Crabro rufifemur** Pack.

Crabro rufifemur Packard, l. c., p. 81, ♂ ♀.

♀.—Head large, not lower than usual when seen from the front, strongly produced behind the eyes, with tolerably close and coarse punctures, closest and finest in front; impressed line extending from fore ocellus to the frontal depression tolerably distinct; ocelli as usual, the space between hind pair less than that between them and the nearest eye-margin; pronotum strongly margined anteriorly, subangular laterally; dorsulum with coarse punctures, closest anteriorly; scutellum more sparsely and less coarsely punctured; mesopleurae coarsely striato-punctate throughout; middle segment with the medial furrow narrow, not deep, closely punctato-striate, above the striæ rather indistinct, on posterior face stronger and transverse, lateral ridges not developed, sides almost smooth, though evidently delicately striated, the upper ridge not very strong; abdomen distinctly punctured, the first dorsal segment rather coarsely so, second ventral with large separated punctures. Black; mandibles except apex, scape, two large spots on pronotum, tegulæ, scutellum more or less, and a small lateral spot just anterior to it, metanotum more or less, femora above in part, tibiæ, tarsi (the apical joints darker), spot on each side of abdominal segments 1–3, those on segments 1 and 2 shortest, broadest and more or less obtuse within, those on the third segment long, narrow, pointed internally, and a band on segments 4 and 5, yellow; the femora are in part also rufous and sometimes are entirely of that color and yellow; trochanters sometimes rufous or yellowish; head and thorax scarcely pubescent; wings paler than in *villosus*, nervures and stigma testaceous. Length 10–13 mm.

♂.—Very much like the ♀, but more coarsely sculptured, particularly the abdomen; first joint of medial tarsi as long, or longer than the following two united, slightly produced at apex, not at all angular; second joint more strongly produced at apex, somewhat curved; colored as in the other sex, but no spots on scutellum, and the abdominal marks narrower. Length 8–11 mm.

Illinois, westward to Montana, south to Nebraska; eastward to Massachusetts, south to New Jersey, north to Canada. I have received this apparently common species from most of my correspondents. Its geographic distribution is no doubt greater than the material at hand indicates.

31. **Crabro villosus** n. sp.

♀.—Head low, when seen from the front, strongly transverse, but little produced behind the eyes, with very close, tolerably coarse punctures, or the sculpture particularly that of the front may be described as granulated; impressed line extending from fore ocellus to frontal depression indistinct; hind ocelli placed behind an imaginary line drawn across the vertex from the outer orbit of one eye to the other, the space between them not quite as great as that separating them from the eye-margin; pronotum not margined anteriorly, but transversely furrowed, at the sides rounded; dorsulum with tolerably coarse punctures, which are closest anteriorly; scutellum sparsely punctured; mesopleurae coarsely striato-punctate, sparsely so on lower portion of epimerum; middle segment with the medial furrow broad and deep, above with rather coarse striations curving somewhat to the sides, the posterior face roughened and punctured, lateral ridges well developed, sides less rough than the posterior face, somewhat striated, bounded above by a strong ridge, which does not reach the posterior face; abdomen not

distinctly punctured, except the pygidium, which has large, coarse punctures, the first segment short and more transverse than in the other species of the group. Black; mandibles, except apex, clypeus except fore margin, scape, pronotum, tubercles, scutellum and metanotum more or less, femora at tips and on the fore and medial pairs beneath in part, tibiæ except a spot within on anterior and hind pair and a spot at apex of latter, tarsi, band on first segment of abdomen, large maculations on the second, third and fourth segments almost touching internally, those on second broadest and truncate within, the others more pointed internally, a band on fifth segment, and ventral segments 2–5 almost entirely, yellow; head and thorax clothed with rather dense, shaggy, pale fuscous hair; wings subhyaline, darker apically, the marginal cell not much broader medially than at apex, and not or scarcely angular beneath, in consequence of which the submarginal cell is not narrowed at apex as in the allied species. Length 11 mm.

California. A very distinct species.

9. Group *singularis*.

The three species constituting this group are easily distinguished by the peculiar striation of the dorsulum—anteriorly it runs transversely, posteriorly is longitudial. The pygidium in ♀ is strongly depressed or excavated on apical portion, and is greatly narrowed at that point, and the pygidial segment basally is furnished on each side with long, stiff, hairs. In the ♂ the first joint of flagellum is much slenderer than the remaining joints, the point of junction with the second joint being consequently well defined, the latter joint is also somewhat irregular; fore femora beneath armed with a strong spine, which projects backward; fore tarsi flattened, but scarcely broadened.

32. **Crabro singularis** Sm.

Crabro singularis Smith, Cat. Hym. Brit. Mus., iv, p. 417, ♂.
Crabro quadrangularis Packard, l. c., p. 85, ♀.
Crabro singularis Packard, ibid. p. 86, ♂ ♀.
Crabro 14-*maculatus* Packard, ibid. p. 87, ♂.

♀.—Head large, almost quadrate, finely and closely punctured, very closely so in front; space between eyes at base of clypeus somewhat greater than the width of the latter in the middle; first joint of flagellum distinctly longer than the two following united; pronotum strongly furrowed on each side, dentate laterally, punctate; meso- and metapleuræ coarsely striated, the sides of middle segment with the striæ fewer and coarser; middle segment above with the enclosure usually well marked, with coarse, longitudinal striæ, the central furrow foveolate, posterior face with irregular rugæ, the lateral ridges not at all developed. Black, mandibles except apex, scape entirely or in part, two spots on pronotum, tubercles, scutellum more or less, sometimes not at all spotted, sometimes the tips of fore and medial femora, tibiæ except within, first joint of tarsi, a long narrow spot, pointed internally, on each side of abdominal segments 2–5, and sometimes a small spot on each side of segments 1 and 6, yellow; no silvery pubescence on

cheeks; wings pale fusco-hyaline, paler basally, a dark cloud at apex of marginal cell. Length 13–16 mm.

♂.—Head greatly narrowed posteriorly, deeply excavated in front, finely punctured above, not or indistinctly striated; pronotum narrower than the occipital margin of the head, broadly but not deeply furrowed on each side, strongly dentate laterally; middle segment more coarsely sculptured than in the ♀, coarsely and irregularly rugose above; fore femora with a long, spine beneath, which points backward, the fore tarsi flattened but not broadened; no yellow on scutellum; fore femora and tibiæ entirely, medial femora above, base of middle tibiæ on outer side, hind tibiæ except apex, yellow; abdomen spotted as in the ♀, but an additional spot sometimes on the seventh segment laterally; cheeks beneath, fore femora and mesosternum with long, rather dense, white hair; form slender. Length 9–14 mm.

Canada; Maine; New Hampshire; Massachusetts; Connecticut; New Jersey; Pennsylvania; Louisiana; Illinois. *C. quadrangularis* seems to differ only in its larger size, and *C. 14-maculatus* in having two additional spots on abdomen. As the size and number of spots are variable I place these two species as synonyms of *singularis*.

33. **Crabro trapezoideus** Pack.

Crabro trapezoideus Packard, l. c., p. 89, ♂.

♂.—Head above rather coarsely striato-punctate, not as long or narrowed as much posteriorly as in the ♂ of *singularis;* pronotum strongly furrowed on each side, as broad as the occipital margin of the head, the lateral tooth not well developed; striæ of mesopleuræ and sides of middle segment closer and somewhat coarser than in the species mentioned above, the middle segment above and behind coarsely rugose; fore legs as in *singularis*. Black; mandibles, except tips, scape entirely, pedicellum in part, pronotum almost entirely, tubercles, scutellum anteriorly, fore legs entirely, medial legs (except the coxæ, trochanters, base of femora beneath and apical joints of tarsi), hind femora above, tibiæ except apex, and first joint of tarsi, and a spot on each side of abdominal segments 2–6, yellow; dense, white hair on the cheeks beneath, mesosternum and fore femora; wings subhyaline, but little darker apically, darkest in marginal cell and beyond. Length 11 mm.

Illinois. Resembles closely the ♂ of *singularis*, but is distinguished by the coarse striation of head above, form of pronotum and spotted scutellum. Appears to be rare, as I have only seen the unique type.

34. **Crabro aciculatus** Prov.

Crabro aciculatus Provancher, Hym. Quebec, p. 664, ♀ ♂.

♀.—Head shorter and more transverse than in ♀ *singularis*, finely and more closely punctured; space between eyes at base of clypeus somewhat less than the width of the latter in the middle; first joint of flagellum distinctly shorter than the two following united, but little longer than the second joint; pronotum not strongly furrowed, not dentate laterally, transversely striated; meso- and metapleuræ coarsely striated, the sides of the middle segment, however, smooth, or else indistinctly striated, above with longitudinal striæ, between which are punctures, posterior face transversely striated, particularly on apical portion, the lateral

ridges distinct, though not strong. Black, including the scutellum; mandibles except tips, scape entirely, two spots on pronotum, tubercles in part, extreme tip of fore femora, and medial tibiæ except within, hind tibiæ entirely, first joint of tarsi, large spot on each side of abdominal segment 2, broadest internally, narrower spot on segments 3 and 4 pointed within and a broad band on segment 5, yellow; silvery pubescence in the usual situations including the cheeks; wings subhyaline throughout, with exception of a slightly darker spot at tip of marginal cell. Length 13 mm.

Canada; Illinois. A less robust species than *singularis*, with smaller head, striated pronotum and short first joint of flagellum. This species seems to be closely allied to, if not identical with *C. frigidus* Smith. I have not seen the ♂, which Provancher describes as follows: "Scape black, with a yellow line anteriorly; thorax not at all maculated, except a large yellow spot on tubercles. Abdomen elongate, with a broad yellow band at the base of fifth segment, the sixth entirely yellow."

10. Group *largior*.

Pygidium (♀) broad, flat, not excavated; first joint of hind tarsi distinctly longer than the longer spur of hind tibiæ; ♂ flagellum distinctly dilated or expanded; fore tibiæ of same sex bearing a large vari-shaped shield, the fifth joint of fore tarsi bearing a peculiar appendage.

35. **Crabro largior** n. sp.

♀.—Head finely punctured, very closely so in front; space between hind ocelli a little less than that between them and the nearest eye-margin; anterior margin of clypeus not dentate; pronotum not margined anteriorly, armed with a small, blunt, tooth laterally; dorsulum with tolerably coarse, more or less separated, punctures; mesopleuræ punctured similarly to the dorsulum, but more sparsely above with indistinct striations; middle segment above striated about as in *monticola*, but less coarsely, and tends to rugose, basally however, are some heavily marked ridges or striæ, which become gradually obsolete, the posterior face striato-punctate, its lateral ridges poorly developed extending only about half way to upper surface, sides more or less striated. Black; mandibles and clypeus more or less, sometimes entirely black, scape entirely or with a spot posteriorly, two large spots on pronotum, tubercles, scutellum more or less, tips of the femora, tibiæ except a spot within, tarsi (the apical joints darker however), a sinuous spot on each side of the first dorsal abdominal segment, broader spot at each side of second and third, a broad band on fourth and fifth and irregular lateral spot on second, third and sometimes the fourth ventral segments, yellow; head and thorax with tolerably long, shaggy and dense, pale fuscous pubescence not short or stiff on dorsulum; wings subhyaline, with a yellowish tinge, darker apically, with a fuscous cloud at apex of marginal cell. Length 13–15 mm.

♂.—This sex resembles that of *pleuralis*, but differs as follows: space between hind ocelli but little less than that between them and nearest eye-margin; four

apical joints of flagellum scarcely longer than the four preceding joints united, the two penultimate joints not longer than broad; pronotum with a poorly developed ridge anteriorly, the lateral tooth smaller; epimerum mesopleuralis with large, sparse, punctures, only striated above: middle segment less coarsely sculptured: first joint of medial tarsi longer by about one-fifth than the remaining joints united; anterior femora at base of outer margin with a short, sharp production; tibial shield smaller than in *pleuralis*, and scarcely as acute at apex, in color, the greater part black, basally greenish, with broken streaks of yellow, first joint of fore tarsi longer than the remaining joints united; anterior trochanters and femora in part, tubercles and scutellum sometimes black; a lateral yellow spot sometimes on fourth ventral segment: mesosternum with long, sparse, pale pubescence; first joint of fore tarsi black; wings subhyaline, tinged with yellow. Length 11–13 mm.

Nevada; Colorado; Texas; Montana. The markings of the abdomen are much heavier than in the two following species.

36. **Crabro pleuralis** n. sp.

♀.—Head finely and indistinctly striato-punctate above, in front distinctly striated; space between hind ocelli less than that between them and the nearest eye-margin; anterior margin of clypeus with a large blunt tooth on each side; pronotum not margined anteriorly, the lateral tooth small, but sharp and distinct; dorsulum with exceedingly compact punctures, rather granulated than punctured; mesopleuræ striated, most distinctly above, the striæ interspersed with punctures on lower portion: middle segment with tolerably fine, even, longitudinal striations, the medial furrow rather narrow, posterior face transversely striated, lateral ridges tolerably well developed, sides striated, the strength of the striæ variable. Black, including tubercles; mandibles except apical third, clypeus more or less (sometimes almost entirely black), scape except spot posteriorly, two spots on pronotum almost touching medially, scutellum anteriorly, femora narrowly at tips, tibiæ except spot within, tarsi entirely, the apical joints, however, darker, two sinuated spots on first abdominal segment, touching internally, an elongate spot on each side of segments 2 and 3, obtuse internally, a band on segments 4 and 5, an irregular spot on each side of ventrals 2 and 3, yellow; head with the pubescence about as in *monticola*, that on the dorsulum short and stiff; wings subhyaline, slightly darker apically, nervures and stigma paler than in the species mentioned. Length 12–13 mm.

♂.—Head coarsely striato-punctate, above; checks strongly depressed and ridged beneath near the eye-margin; space between hind ocelli much less than between them and the nearest eye-margin; flagellum broadest at the fourth joint, narrowed from that point to the apex, the first joint with a bunch of pale hair beneath, four apical joints distinctly longer than the four preceding joints united, the two penultimate joints longer than broad; pronotum not margined anteriorly, but very strongly dentate laterally; dorsulum coarsely and compactly punctured, the mesopleuræ coarsely striato-punctate, their episternal furrow rather strongly foveolate; middle segment above more coarsely and irregularly striated than in the ♀, the sides and posterior face much more so than in that sex, lateral ridges of posterior face well developed; first joint of medial tarsi but little if anything longer than the remaining joints united; anterior femora at the base of outer margin with a large, somewhat bifurcated, production; tibial shield large, shaped about as in *pallidus*, in color: basally yellow, posteriorly greenish, streaked

and dotted with yellow; first joint of fore tarsi about as long as the remaining joints united; anterior trochanters beneath and femora entirely yellow; colored otherwise as in ♀, the apical tarsal joints, however, testaceous, markings of abdomen narrower, a band on sixth dorsal and lateral spot on third ventral; wings somewhat darker than in ♀, the cloud at apex of marginal cell darker; mesosternum with long, sparse, pale fuscous hair. Length 14 mm.

Vancouver; Washington: Seattle (O. B. Johnson); Colorado. The female may be distinguished from that of *monticola* and *largior* by its sculpture, particularly that of the head and mesopleuræ; the ♂ by the greater combined length of the four apical joints of flagellum, the lesser space between hind ocelli and paler markings of tibial shield.

37. **Crabro monticolus** Pack.

Thyreopus monticola Packard, l. c., p. 367, ♀.

Crabro monticola Kohl, l. c., p. 585.

♀.—Head finely and closely punctured more coarsely so anteriorly; space between hind ocelli a little less than that between them and nearest eye-margin; pronotum very slightly margined anteriorly, the lateral tooth not strong; dorsulum with rather strong punctures, well separated posteriorly, anteriorly close; epimerum mesopleuralis more sparsely punctured, the episternal suture strongly foveolate: middle segment above with longitudinal, more or less irregular, ridges or coarse striæ, which swerve somewhat towards the sides, the medial furrow broad, posterior face transversely rugose on apical portion, the lateral ridges but tolerably developed, the sides indistinctly striated. Black, including clypeus; a minute dot on mandibles near base, scape except spot posteriorly, two spots on pronotum, tubercles, scutellum anteriorly more or less, tibiæ except spot within and hind pair at apex, first joint of tarsi, a sinuous spot on each side of the first abdominal segment, wedge-shaped spot, pointed internally on each side of second, narrower spots or lines on third and fourth also pointed within, a band on segment five emarginate on each side anteriorly, and irregular spots on second ventral segment yellow; head and thorax with a tolerably thick and long, pale fuscous pubescence; wings fusco-hyaline, paler basally, nervures and stigma dark testaceous. Length 13–14 mm.

New Hampshire (Packard); Canada (Provancher); Virginia; Georgia.

38. **Crabro pallidus** n. sp.

♀.—Head finely and closely punctured, in front more strongly and in addition indistinctly striated; space between hind ocelli about equal to or slightly less than that between them and nearest eye-margin; space between eyes at base of clypeus greater than the width of the clypeus in the middle, the anterior margin of the latter subtruncate, slightly produced medially, the lateral angles sharp but scarcely dentate; pronotum not ridged anteriorly, obtusely dentate at the sides; dorsulum with strong, scattered punctures, those on mesopleuræ finer and sparser, episternal suture with the foveæ not strongly marked, though present; middle segment above with a somewhat triangular depression, less marked in some specimens than in others, covered with strong striæ curving toward the sides, posterior face

less strongly and transversely striated, the strength of the lateral ridges gradually diminishing toward the upper surface, sides somewhat coriaceous. Black; mandibles and clypeus except their apices, scape, pedicellum in part, pronotum, tubercles, scutellum, metanotum, tips of femora, tibiæ, except a spot within, first joint of tarsi, band on first abdominal segment, large spots on second and third barely touching within, band on fourth and fifth and irregular spots on ventrals 2–5, those on segment 2 largest and sometimes touching, whitish; wings pale subhyaline, dusky at apex, nervures and stigma pale testaceous; pubescence of head and thorax whitish silvery in the usual situations. Length 8–10 mm.

♂.—Head coarsely and closely punctured, the cheeks striated as in *argus*, but indistinctly, strongly depressed, though but slightly produced posteriorly, apparently not ridged beneath; anterior margin of clypeus strongly dentate laterally, emarginate medially or incurved; flagellum broadest at about the fourth joint, narrowed from that point to the apex, first joint broadened to meet the second, with a prominent bunch of pale hairs beneath, four apical joints about as long as the four preceding ones united; thorax more coarsely sculptured than in the ♀, the pronotal teeth stronger; first joint of medial tarsi scarcely longer than the remaining joints united; fore femora in shape triangular, about two-thirds as broad at base as they are long; tibial shield shaped as in *argus*, but larger, and the outer edge more strongly sinuated, in color outer half greenish white, streaked and dotted blackish, remainder dark brown; colored like the ♀, with the fore femora, all the coxæ and trochanters more or less, and medial legs entirely whitish; mesosternum with dense, white pubescence. Length 9–10 mm.

Montana.

39. **Crabro æqualis** n. sp.

♀.—Head finely and closely punctured, in front with a delicate striation; space between hind ocelli about equal to or slightly greater than the space between them and the nearest eye-margin; space between eyes at base of clypeus less than the width of the latter in the middle, much narrower than in *argus*; anterior margin of clypeus slightly sinuous, lateral angles not dentate; first joint of flagellum about as long as the two following united; pronotum not strongly ridged anteriorly, but strongly dentate at the sides; dorsulum with fine, even, tolerably close punctures, those on mesopleuræ still finer and more scattered, the episternal suture very strongly foveolate; middle segment very coarsely rugose, the median channel broadened decidedly toward base, on upper surface the rugæ form irregular foveæ, posteriorly transverse, the lateral ridges well developed and reaching the upper surface, sides smooth, at least medially; pygidium coarsely punctured as in most species of this section. Black; mandibles and clypeus except their apices, scape, pronotum, tubercles, scutellum and metanotum more or less, tips of the femora, particularly the fore and medial pair, tibiæ except a spot within and apex of hind pair, tarsi more or less, a band on first abdominal segment, a large spot at each side of second pointed within, narrower spots on third and fourth, those on latter almost touching within, smaller spots on fifth, and a spot on each side of ventrals 2 and 3, yellow; silvery pubescence in the usual situations, particularly obvious on mesosternum; wings fusco-hyaline, paler at base, nervures and stigma dark testaceous. Length 8 mm.

Georgia. Resembles *C. cingulatus* superficially, but the strongly dentate pronotum, punctured pygidium, greater length of first joint

of flagellum, etc., will serve in distinguishing it. The discovery of the ♂ may relegate it to the preceding group.

40. **Crabro discretus** n. sp.

♀.—Head finely and closely punctured, more transverse than in *æqualis*, front with the punctures stronger and closer; space between eyes at base of clypeus but slightly, if anything, less than the width of the latter in the middle; anterior margin of clypeus broadly truncate, not or scarcely dentate laterally: first joint of flagellum about as long as the two following united; pronotum anteriorly ridged at the sides only, rather strongly dentate at sides; dorsulum subopaque, with tolerably strong punctures, close anteriorly and evenly separated on posterior portion, those on mesopleuræ larger and sparse, episternal suture strongly foveolate; middle segment about as in *æqualis*, but a little less strongly rugose, and the foveæ formed by the rugæ smaller, foveæ margining the posterior face outwardly much smaller, and the sides more distinctly striated; pygidium coarsely punctured, longer and less triangular than in the species mentioned above. Black; no yellow on tegulæ or metanotum; small spot on mandibles basally, clypeus except fore margin, scape entirely, pronotum, tubercles, scutellum more or less, extreme tips of four anterior femora, tibiæ except a spot within, tarsi (apical joints darker), narrow sinuated spot on each side of first abdominal segment, broader spots, pointed within, on second longer, narrow spots on third, and a band on fourth and fifth, yellowish; ventrals not yellow, but their apical margins testaceous; wings fusco-hyaline, nervures and stigma dark testaceous. Length 9 mm.

District of Columbia (in coll. Ashmead).

41. **Crabro argus** Packard.

Crabro argus Harris (no descr.), Catal. Ins. Mass., p. 68 (teste Packard).
Thyreopus argus Packard, l. c., p. 359, ♂.
Crabro argus Kohl, l. c., p. 584.

♀.—Clypeus broadly truncate anteriorly, strongly dentate at each side, shaped as in *C. cingulatus*; head finely and closely punctured, most strongly so anteriorly; space between hind ocelli rather distinctly less than that between them and nearest eye-margin; first joint of flagellum shorter than the second; pronotum anteriorly ridged at extreme sides only, the lateral tooth strong; dorsulum punctured like the vertex, but more strongly; epimerum mesopleuralis with tolerably fine, well separated though not sparse punctures, the episternal suture very strongly foveolate; middle segment above with coarse ridges, which form very large foveæ, on posterior face the mesial furrow is restricted to a medial, pyriform pit, which is surrounded by a series of large foveæ, exterior to these foveæ on each side is a deep furrow, margined within and without by a ridge, sides of middle segment not striated; pygidal area longitudinally rugose. Black; mandibles except apex, scape, clypeus more or less, two strongly sinuated spots on pronotum, tubercles, tips of fore and medial femora, tibiæ except a spot within, first joint of tarsi except apex, two rather broad, slightly sinuated spots on first abdominal segment, almost touching within, large spot at each side of second pointed within, longer and somewhat narrower spots on third, long spots on fourth almost touching within and a band emarginate on each side on fifth, yellow; scutellum black; wings subhyaline, with a slight yellowish cast, darker apically, nervures and stigma testaceous. Length 9 mm.

♂. Cheeks striated from the eyes backward instead of from top to bottom as is usually the case, strongly depressed below and produced posteriorly into a strong tooth or prominence; anterior margin of clypeus somewhat rounded out, not dentate laterally, in the middle slightly emarginate; scape short, hardly one-quarter times longer than the space between the eyes at the base of clypeus; first joint of flagellum small, not dilated or produced, in length about as long as the pedicellum, joints 2-6 with a large appendage on outer edge, that on joints 2-4 somewhat curved, and pointed at apex, that on second joint narrowest and most curved, that on sixth broadest and not at all curved, four apical joints shorter than the three preceding ones united; thorax somewhat more coarsely sculptured than in the female, the epimerum mesopleuralis, however, smooth, impunctate, separated from mesosternum by a distinct furrow, which is strongest anteriorly; medial furrow of posterior face of middle segment larger than in ♀; first joint of medial tarsi fully twice as long as the remaining joints united; base of fore femora outwardly terminating in a long, slender production; tibial shield long, pointed apically, the outer margin once sinuated, the opposite margin revolute, in color greenish yellow basally, dotted with paler, otherwise brownish, also dotted with yellow; first joint of fore tarsi more than twice as long as the remaining joints united; colored like the ♀, but differing as follows: medial legs entirely, greater part of fore femora, yellow; spots on pronotum sometimes wanting; mesosternum with a dense white pubescence, hind femora with a black spot externally. Length 9-10 mm.

Canada (Harrington); Maine (Packard); New Hampshire: Franconia (Mrs. Slosson); Long Island, New York (Ashmead); Washington. The specimen of latter locality may be labeled erroneously, as I have seen no specimens from intermediate localities. The ♀, of which I have examined but one specimen collected by Mrs. Slosson, is difficult to separate from *C. cingulatus* of the preceding group. The absence of maculations on scutellum and metanotum, small spots on pronotum, dark spots on the tibiæ within, darker wings and smaller maculations of abdomen will aid in distinguishing this species. The ♂ is too distinct to require comment.

42. **Crabro tennis** n. sp.

♀.—Head with fine, tolerably close punctures, though not so close as in the preceding species of this section; space between hind ocelli about equal to or slightly less than that between them and the nearest eye-margin; clypeus rather longer than usual, the anterior margin strongly rounded out; pronotum not ridged anteriorly, angular at the sides, but not dentate; dorsulum with fine, rather close, even punctures, those on the epimerum mesopleuralis stronger and sparse, the episternal suture distinctly though not very strongly foveolate; middle segment above with coarse ridges curving toward the sides, the medial furrow unusually broad and shallow, posterior face rugose at apex only, the lateral ridges well developed, sides with a rather fine striation. Black; basal half of mandibles, clypeus more or less, scape anteriorly, two spots on pronotum, tubercles, scutellum more or less, fore and medial tibiæ except a spot within, basal portion of hind pair, first joint of tarsi, sinuated spot on each side of first abdominal segment, broad spot on second narrow, somewhat sinuated spot on each side of third to fifth,

those on the latter segment sometimes reduced to dots, yellowish white; pale hair on vertex and cheeks rather prominent; silvery pubescence in usual situations; wings subhyaline, but little darker apically, nervures and stigma dark testaceous. Length 7.5–8 mm.

♂.—More coarsely sculptured than in ♀; head striated in front, above and on cheeks rather coarsely and closely punctured; flagellum broadest basally, the first joint with a bunch of white hairs beneath; anterior margin of clypeus with a prominent quadrate production medially; cheeks strongly depressed below; pronotum with a small tooth laterally; dorsulum closely but less coarsely punctured than occiput; mesopleuræ with the epimerum above striated similarly to its episternum; middle segment with sides more coarsely striated, the posterior face more rugose, the lateral ridges longer, reaching the upper surface, first joint of medial tarsi scarcely one-third longer than the length of the remaining joints united; tibial shield somewhat longer than broad, the lower margin almost straight, not sinuate or emarginate, posteriorly the shield rounded, in color brownish in greater part, otherwise greenish, narrowly streaked with yellow, yellow also at extreme base; marked very much as in the ♀, except as follows: no yellow on scutellum, and tubercles, fore femora almost entirely, middle femora with a stripe anteriorly and posteriorly, a line on hind tibiæ anteriorly and posteriorly and a small spot on each side of ventral abdominal segment 2, yellowish. Length 8 mm.

Colorado. The small size, sculpture of ♀, shape of tibial shield of ♂, and shape of fore margin of clypeus are the chief points of difference in this species.

43. **Crabro medius** n. sp.

♂.—Head coarsely and closely punctured, distinctly striated anteriorly; space between hind ocelli rather distinctly less than that between them and the nearest eye-margin; flagellum not much broadened, widest medially, first joint without bunch of hairs beneath; cheeks coarsely striated, slightly depressed, not keeled beneath; pronotum strongly ridged anteriorly, particularly toward the sides, the lateral tooth strong and sharp; dorsulum and scutellum coarsely and closely punctured; epimerum mesopleuralis sparsely punctured, separated from the mesosternum by a strong furrow, episternal suture strongly foveolate; middle segment very coarsely rugose, the ridges on upper surface forming foveæ, on posterior face transverse, and not so strong; lateral ridges exceedingly strong, the sides with irregular striations; first joint of medial tarsi somewhat less than one-third longer than the remaining joints united; form femora at base extended into an acuminate production, which is nearly as long as that part of the femora before its junction with the trochanter; tibial shield rather small, obtuse apically, outer margin being sinuated or once emarginate, in color the lower portion is deep black, on remainder yellowish streaked with blackish. Black, including scape posteriorly, and thorax entirely; spot on mandibles medially, scape anteriorly, greater part of fore femora, tips of medial pair and a spot before their apices, tibiæ except a dark spot within and on fore pair without, first joint of tarsi, sinuated spots on first abdominal segment, large spots on second, slender spots on segments 3–6, all of which are separated medially, and usually though not always, a lateral spot on ventrals 2 and 3, yellow; clypeus either black or more or less yellow; pubescence on mesosternum rather long; wings subfuscous, nervures dark, the stigma paler, testaceous. Length 7–8.5 mm.

Washington; Nevada. The specimen from the latter locality is smallest and less coarsely sculptured. A ♀ specimen from the first mentioned locality I refer here with some doubt; it resembles *advenus*, but the clypeus is black and dentate laterally; sculpture of the dorsulum is coarser, that of the epimerum mesopleuralis sparser, while that of the upper surface of middle segment tends to a rugged rather than a ridged nature; the markings are of a deeper yellow, those on abdominal segments 2–6 heavier and not at all sinuate or emarginate; tips of femora yellowish, as well as mandibles except tips. Length 10 mm.

44. **Crabro Provancheri** n. n.

Thyreopus sinuatus Provancher (nec Fabr.), Hym. Quebec, p. 664, ♀.

♀.—Head finely and closely punctured, not striated on front and vertex, but more strongly punctured; space between hind ocelli slightly less than that between them and the nearest eye-margin; anterior margin of clypeus not dentate laterally; pronotum well ridged anteriorly, the lateral tooth strong and sharp; dorsulum with tolerably close and strong punctures; scutellum similarly punctured; mesopleuræ with finer but sparser punctures, the episternal suture strongly foveolate; middle segment above with coarse, somewhat radiating ridges, which terminate outwardly at a strong curved ridge, which bounds the upper surface, posterior face transversely and less coarsely rugose, the lateral ridges well developed, sides except medially, striated. Black, including the scape except extreme apex; spots on mandibles medially, clypeus, pronotum almost entirely, tubercles, scutellum anteriorly, tips of femora and a spot beneath near the apex of fore and medial pair, tibiæ except darker spot within, first joint of tarsi, and spots on the abdomen as in *cribrellifer*, yellow; wings subhyaline, darker at apex, nervures and stigma dark testaceous. Length 12 mm.

Toronto, Canada (Provancher); Jacksonville, Florida (Ashmead). A *Crabro sinuatus* has been described from Europe, thus making it necessary to change Provancher's name. This species will probably prove to be the ♀ of *cribrellifer*.

45. **Crabro cribrellifer** Pack.

Thyreopus cribrellifer Packard, l. c., p. 358, ♂.

Crabro cribellifer (sic) Kohl, l. c., p. 585.

♂.—Head closely punctured, anteriorly most coarsely being striato-punctate; space between hind ocelli a little less than that between them and the nearest eye-margin; flagellum broadest basally, not so broad as in *latipes*, the basal joint with a bunch of white hairs beneath; cheeks depressed, not produced posteriorly, scarcely ridged beneath; pronotum strongly ridged anteriorly, the lateral tooth well developed, acute; dorsulum with distinct, tolerably well separated punctures, closer and finer, however, than in *latipes:* epimerum mesopleuralis very sparsely punctured, almost smooth, the episternal suture as well as that which separates the epimerum from the mesosternum heavily defined and strongly foveolate; middle segment above very coarsely rugose, the rugæ forming irregular foveæ, on posterior face transverse, the lateral ridges very strong and extending to the upper

surface, sides coarsely striated; fore femora remarkably shaped, being fully three times broader than long, flattened; tibial shield large leaf-like, decidedly longer than broad, obtusely pointed apically, the outer margin bilobate, or in other words strongly emarginate medially, in color brownish, closely dotted with pale basally, sparsely so on remaining portion; first joint of fore tarsi scarcely longer than the remaining joints. Black, including the scape, except extreme apex, and scutellum and postscutellum; spot on mandibles medially, clypeus more or less, two sinuous spots on pronotum, tubercles, fore femora, medial femora apically, tibiæ except a spot within, basal joint of tarsi, two sinuous spots on abdominal segment 1, two broader spots on segment 2, long narrow spots on 3, and a band on segments 4–6, emarginate anteriorly and sometimes separated medially, yellow; silvery pubescence in the usual situations; wings subhyaline, slightly darker apically. Length 10–11 mm.

Canada (Harrington); Maine and Massachusetts (Packard); Long Island, New York (Ashmead); Illinois. Having one of Packard's types before me I must take exception to his description of the fore femora, he says, "(fore) femora twice as long as broad . . . . ," while in the specimen before me the femora are as described above.

46. **Crabro latipes** Sm.

Crabro gryphus Harris, Cat. Ins. Mass., p. 68 (teste Packard).
Crabro latipes Smith, Cat. Hym. Brit. Mus., iv, p. 396, ♂.
Crabro latipes Cresson, l. c., p. 177.
Thyreopus latipes Packard, l. c., p. 355, ♂.
Thyreopus coloradensis Packard, ibid., p. 356, ♂.
Crabro latipes Kohl, l. c., p. 584.
Crabro coloradensis Kohl, ibid., p. 585.

♂.—Head closely punctured, most coarsely so anteriorly, where it has the appearance of being striato-punctate; space between hind ocelli but little less than that between them and the nearest eye-margin, the space between the eyes beneath at base of clypeus, fully equal to or slightly greater than the length of the clypeus in the middle; flagellum broadest by far towards the base, and narrowed to apex from second joint, the first joint without a bunch of white hairs beneath; cheeks keeled beneath near the eye-margin, depressed, but not produced posteriorly; pronotum with a small tooth laterally, but not ridged anteriorly; dorsulum with rather coarse, well-separated punctures, closest anteriorly; mesopleuræ more finely punctured, the episternal suture not very strongly foveolated, furrow separating the epimerum mesopleuralis from mesosternum present, but feebly developed; middle segment above and posteriorly rugose, most coarsely above, the basal series of foveæ more prominent than usual, lateral ridges of posterior face strong, extending somewhat beyond the middle though not reaching the upper surface; first joint of medial tarsi nearly twice as long as the remaining joints united; tibial shield large, leaf-like, much longer than broad, acuminate apically, its outer margin trilobate, in color: apically yellow, with three broad, dark streaks, basally black with several pale, narrow streaks; first joint of fore tarsi more than twice longer than the remaining joints united. Black; mandibles, except apex, clypeus more or less, scape anteriorly, fore trochanters, femora and tibiæ in part, medial

trochanters beneath, their femora anteriorly and posteriorly, medial and hind tibiæ except internally, first joint of tarsi, a sinuous spot on each side of first abdominal segment, broader spots on second, long slender marks on segments 3–6, those on segments 4, or 5 and 6 generally touching within, thus forming a band, and small lateral spots on second ventral, yellow; thorax not at all marked with yellow; mesosternum with a rather long, pale pubescence. Length 8–10 mm.

Nova Scotia (Smith); Canada (Harrington); Montana; Colorado; Arizona; Oregon; Washington. Notwithstanding the differences pointed out by Packard between *latipes* and *coloradensis* I feel obliged to unite the two. I have the types of *coloradensis* before me and fail to discover the differences indicated by that author. It is true that the abdomen in his type specimens is longer than in others, but a large series, twenty-four specimens, shows the intergradational forms to the specimens with the shorter, more ovate abdomen.

47. **Crabro vicinus** Cress.

Crabro vicinus Cresson, l. c., p. 479, ♀.
Crabro succinctus Cresson (in pt.), ibid. p. 479, ♀.
Thyreopus advenus Packard (in pt.), l. c., p. 368.
Thyreopus succinctus Packard, ibid. p. 369.
Crabro vicinus Cresson, Synopsis, p. 285.

♀.—Head finely and closely punctured; space between hind ocelli but slightly less than that between them and the nearest eye-margin; anterior margin of clypeus situated, but not strongly, not or scarcely dentate laterally; pronotum feebly furrowed at the sides, not ridged anteriorly, and not at all dentate laterally; dorsulum with rather strong, well-separated punctures, particularly on posterior portion; punctures of mesopleuræ not stronger than those of the dorsulum but much sparser, the episternal suture with tolerably strong foveæ; middle segment above with a rather fine striation, curving toward the sides and basally sometimes with a few short, stronger striæ or ridges, posterior face roughened, coriaceous, the lateral ridges becoming obsolete above the middle, sides with a fine, rather indistinct, striation. Black; mandibles except apex and extreme base, clypeus more or less, generally entirely except fore margin, scape, sometimes spotted behind with black, spots on pronotum sometimes almost connected within and again being absent, tubercles entirely or in part, scutellum more or less (sometimes black), tips of femora, tibiæ except a dark spot within, first joint of tarsi, two sinuous spots on first abdominal segment in some cases connecting internally and thus forming a band, broader spots on segments 2, 3 and 4, those on the latter segment generally forming a band, and irregular spots on ventrals 2 and 3, which may be absent in part or entirely, yellow; wings with a yellowish tinge, the nervures and stigma of that color; pubescence of head and thorax pale gray. Length 8–11 mm.

Colorado; Nebraska (Barber); Nevada; Arizona; California; Mt. Hood, Oregon; Washington; Montana. A specimen labeled Canada has the markings greenish white. This is a variable species, but is easily distinguished by the form of pronotum, fine sculpture of upper surface of middle segment and sculpture of dorsulum. It will probably be placed as the ♀ of *latipes* eventually.

11. Group *tenuiglossus*.

The males of this group differ from those of group *largior* by the simple, non-dilated antennæ, and by the first joint of fore tarsi being without an appendage; otherwise they are the same. The females are indistinguishable from those of the preceding group.

48. **Crabro conspicuus** Cress.

Crabro conspicuus Cresson, Proc. Ent. Soc. Phila., iv, p. 480, ♀.
Thyreopus conspicuus Packard, l. c., p. 369.
Crabro conspicuus Kohl, l. c., p. 585.

♀.—Head finely and closely punctured, but less so than *advenus;* space between hind ocelli less than that between them and the nearest eye-margin; anterior margin of clypeus broadly truncate, armed with a distinct, blunt tooth on each side; pronotum strongly furrowed on each side, the frontal ridges strong, but short, the lateral tooth not well developed; dorsulum a little less closely punctured than in *advenus;* mesopleuræ with large and sparse punctures, stronger than in the species mentioned above, the episternal suture less strongly fovcolate; middle segment as in *advenus*, but the furrow of upper face not so strong, and the sides more feebly striated, sometimes smooth and glabrous medially. Black; mandibles on basal two-thirds, scape, clypeus, two large spots on pronotum, tubercles, scutellum (black in one case) tips of femora, fore pair beneath and sometimes medial pair, tibiæ except a line within, first joint of tarsi, a broad band on first dorsal abdominal segment, two broad spots on second, which are broadly truncate within narrower spots on segments 3 and 4, these spots pointed internally and emarginate anteriorly, a band on segment 5 and an irregular spot on each side of ventral segment 2, yellow; wings subhyaline, darker apically, all the nervures and stigma dark; silvery pubescence in the usual places, but rather sparse. Length 10 mm.

Colorado; Washington. The shape of markings of abdomen seems to be a good superficial character for distinguishing this from *advenus*.

49. **Crabro advenus** Sm.

Crabro pegasus Harris, Catal. Ins. Mass., p. 68 (no descr.).
Crabro advenus Smith, l. c., p. 421, ♀ (non ♂).
Crabro succinctus Cresson (in pt.), Proc. Ent. Soc. Phila., iv, p. 479, ♀.
Thyreopus pegasus Packard, l. c., p. 362, ♂ ♀.
Thyreopus advenus Packard (in pt.), ibid. p. 368.
Thyreopus succinctus Packard, ibid. p. 369.
Crabro advenus Kohl, l. c., p. 584.
Crabro pegasus Kohl, ibid. p. 585.
Crabro succinctus Kohl, ibid. p. 585.

♀.—Head finely and closely punctured; space between hind ocelli about equal to or slightly greater than the space between them and the nearest eye-margin; anterior margin of clypeus broadly truncate, not dentate, the lateral angles obtuse; pronotum strongly furrowed on each side the frontal ridges well developed, the lateral tooth strong; dorsulum with tolerably fine and close, even punctures, those on scutellum sparser; mesopleuræ with rather large and sparse punctures,

the episternal suture strongly foveolate, the epimerum toward the metapleuræ somewhat rugose; middle segment above with coarse ridges running from the base to the sides, those on the posterior face transverse and less strongly developed, lateral ridges strong, extending to the upper surface, sides of middle segment finely striated, scarcely so medially. Black; a spot at base of mandibles generally confined to inner margin, clypeus, scape, two large spots on pronotum, tubercles, scutellum anteriorly, tibiæ, except a spot within and sometimes an outer spot at apex of hind pair, first joint of tarsi, a sinuous spot at each side of first abdominal segment, wedge-shaped spots on second, narrower and longer, somewhat sinuated spots on third and fourth, and a medial elongate spot at apex of fifth, sometimes connected with small lateral dots, which are not always present, yellow; femora entirely black; wings subhyaline, dusky apically, nervures in basal half testaceous, the stigma and remaining veins dark; silvery pubescence in the usual situations, rather long on the cheeks and thorax beneath. Length 9–10 mm.

♂.—Head more coarsely punctured, the vertex and upper part of front distinctly striated; cheeks beneath near the eye-margin with a slight keel; mandibles but slightly swollen toward the base on outer margin; dorsulum more distinctly punctured than in female, the mesopleuræ less distinctly so; epimerum mesopleuralis separated from the mesosternum by an exceedingly strong furrow; middle segment coarsely rugose; above the ridges form large, irregular foveæ, on posterior face are transverse, sides rather coarsely striated; nervures entirely testaceous; marked as in the ♀, but the fore and medial tibiæ are not dark within, and the spots on segments 4 and 5 are connected; tibial shield somewhat cordiform, its outer margin being produced to give it this shape, in color dark brown, narrowly streaked with yellow, except basally; flagellum testaceous beneath, not noticeably broadened; first joint of medial tarsi but slightly longer than the combined length of the remaining joints. Length 7–11 mm.

Nova Scotia (Smith); Ottawa (Harrington); Maine; Long Island (Ashmead); Philadelphia, Pennsylvania (Seeber); West Point, Nebraska (Barber); Colorado; Washington. The ♂ referred by Smith to this species is *C. nigrifrons* Cresson, as no species of this section have the antennæ formed as described by Smith. Packard evidently had *C. ricinus* confused with this species, which accounts for his statement regarding the finely striated propodeum (middle segment). Of the three type specimens of *C. succinctus* Cresson, examined, I find two are *advenus*, and the other identical with *C. ricinus*. It would be impossible to straighten out the synonymy of this species, had I not the opportunity of examining the types of Cresson. Packard gives no locality for *pegasus*, but his specimens were presumably from some of the New England States.

50. **Crabro thyreophorus** Kohl.

Crabro (Thyreopus) thyreophorus Kohl, l. c., p. 585, pl. xiv, figs. 27, 29, ♂ ♀.

♀.—Head with the sculpture subtile; first joint of flagellum distinctly shorter than the following two united; space between hind ocelli less than that between them and the nearest eye-margin; pronotum not furrowed, the sides anteriorly, not dentate, rounded laterally; dorsulum with sparse, shallow punctures, densest

anteriorly; scutellum sparsely punctured; mesopleuræ punctured about like the dorsulum, but more regularly so, the foveæ of the episternal suture scarcely evident; sculpture of middle segment indistinct, above appearing longitudinally and finely striated, the sides and posterior face subtilely sculptured, lateral ridges of the latter absent; abdomen broader than in *vernalis*, not much narrowed to the first segment. Black, including the mandibles; scape, two spots on pronotum, tubercles, line on scutellum, apex of all the femora, tibiæ entirely, tarsi except apical joints, a large wedge-shaped spot on segments of abdomen 1–4, a band on segment 5, and lateral spots on ventrals 2 and 3, bright yellow; head, thorax and first segment of abdomen with unusually long, shaggy, yellowish brown hair; wings fulvo-hyaline, somewhat darker apically, nervures and stigma yellowish; no silvery pubescence, instead the long hair. Length 9–10 mm.

♂.—Sculptured like the ♀, but the middle segment is distinctly striated above, as well as on the sides, and the punctuation of mesopleuræ is closer; space between the hind ocelli very much less than that between them and the nearest eye-margin; antennæ longer and slenderer than in *vernalis*, acuminate at tip; pronotum angular laterally; marks on scutellum sometimes wanting, those on the scutellum not present, markings of abdomen smaller than in the ♀, those on fifth segment generally separated, the sixth segment, however, banded; wings paler than in ♀; clypeus black, with the inner orbits clothed with silvery pubescence; fore trochanters almost equaling their femora in length, not much broadened apically; tibial shield larger and broader than in *vernalis;* basally it is about as broad as long but narrows considerably behind, in color yellow, and medially with irregular dark streaks, at the base broadly margined with black; first joint of medial tarsi distinctly longer than the remaining joints combined. Length 8 mm.

Nevada. I have seen no specimens measuring less than 8 mm.; Kohl gives 7 mm. as the smallest. As in *vernalis*, the males possess no furrow between the epimerum mesopleuralis and the mesosternum.

51. **Crabro vernalis** Pack.

Thyreopus vernalis Packard, l. c., p. 369, ♀.

Crabro vernalis Kohl, l. c., p. 585.

♀.—Head with the sculpture subtile, indistinct; first joint of flagellum about as long as the two following united; space between the hind ocelli somewhat greater than that between them and the nearest eye-margin; lateral impressions of vertex very shallow; pronotum but slightly furrowed at the sides anteriorly, the lateral teeth small and blunt; dorsulum with sparse, shallow punctures, densest anteriorly; scutellum scarcely punctured; mesopleuræ with the punctures slightly stronger than those of the dorsulum, the episternal suture rather strongly foveolate; middle segment above longitudinally and rather finely striated, more distinctly so in some specimens than in others, the posterior face and sides subtilely roughened, the lateral ridges of posterior face very short; abdomen fusiform, the first segment broad at apex, not tumid. Black, including the mandibles and clypeus; scape at apex, large spots on pronotum, tubercles, scutellum, metanotum, tips of fore and medial femora, tibiæ except a line within and apex of hind pair, first joint of tarsi, a wedge-shaped spot on dorsal abdominal segments 1–3, narrower marks on segment 4, and a continuous line on segment 5, whitish; head and thorax clothed with thin, long, pale pubescence; no silvery pubescence on cheeks or thorax; wings subhyaline. Length 7.5–9 mm.

♂.—Sculptured like the ♀, but the middle segment on sides striated, and the episternal suture of mesopleuræ less strongly foveolate; space between hind ocelli slightly less than that between them and the nearest eye-margin; the markings are substantially the same as in the ♀ those on the abdomen, however, touching within, there are small lateral spots on the second and third ventral segments and the clypeus has two white spots; fore femora black, except tips and a short line on outer side at apex: fore trochanters triangular, in length not more than half that of their femora; tibial shield a little longer than broad, its outer and posterior margins strongly rounded, the anterior margin scarcely rounded, in color greenish white, streaked with paler throughout; first joint of medial tarsi about as long as the remaining joints united. Length 7 mm.

Illinois; Colorado. Distinguished by the color of its markings, sculpture, long pubescence of head and thorax, etc. There is no suture between the epinerum mesopleuralis and the mesosternum in this species.

52. **Crabro virgatus** n. sp.

♂.—Front and vertex coarsely striated, cheeks and occiput coarsely and closely punctured; antennæ long, slender, the flagellum decidedly longer than twice the length of the scape; space between hind ocelli distinctly less than that between them and the nearest eye-margin; pronotum at each side behind the strong lateral tooth with a strong pit or fovea; dorsulum coarsely and closely punctured; scutellum and mesopleuræ coarsely striated, with punctures between the striæ; middle segment above and on posterior face rugose, at the base with a transverse row of large foveæ, the channel which divides the upper surface broad, deep and transversely ridged so as to appear foveolated, sides of middle segment striated, less strongly so in the middle; tibial shield broader than long, in shape somewhat triangular, broadly margined anteriorly with black, otherwise, except a black spot near apex of tibiæ grayish, dotted with yellow marks. Black, including the mandibles, clypeus and thorax entirely; scape with a narrow yellow stripe; fore femora beneath, tibiæ more or less, the fore tarsi and the first joint of the other pairs, spot on each side of first abdominal segment emarginate posteriorly near inner end, a wedge-shaped spot on each side of segment 2, linear markings on segments 3–5, spots or lines on segment 6 and a small spot at each side of ventral segment 2, yellow; silvery pubescence scarcely evident on the cheeks, though present in the other usual situations; wings except base subfuscous, nervures and stigma black. Length 8 mm.

Nevada. Easily distinguished by the sculpture. In the single specimen before me dorsal abdominal segments 3–5 have basally a chitinous covering, the apical margin of which is deeply bowed. Whether this is an anomalistic or an ordinary character of the species is difficult to decide without other specimens. I am inclined to regard it as an anomaly.

53. **Crabro incertus** n. sp.

♀.—Head closely punctured; lateral impressions of vertex broad and not deep; space between eyes beneath at base of clypeus less than in *tenuiglossus*, but greater than in *tumidus*, somewhat less than the length of the pedicellum and basal joint

of flagellum united; pronotum strongly furrowed on each side anteriorly, thus forming an anterior ridge which terminates in a strong tooth; dorsulum compactly punctured; mesopleuræ with large punctures, which are not scattered as in the two preceding species, although they are not close by any means; sculpture of upper surface of middle segment variable, generally with a large fovea medially, on each side of which there are smaller fovea, or numerous irregular ridges; in one specimen the upper surface is marked by strong radiating ridges, in the middle with a broad channel, narrowed basally; the remainder of middle segment, sides excepted, rather strongly and transversely rugose; first abdominal segment in form intermediate between *tenuiglossus* and *tumidus*. Black; base of mandibles, scape, greater part of pedicellum, two large spots on pronotum, tubercles, line on scutellum, metanotum, tips of femora, tibiæ except within, a small lateral spot on first abdominal segment, much larger and elongate spots on segments 2–4, and greater part of fifth segment except base and a small black spot laterally, yellow; tarsi yellow testaceous; wings on apical half subfuscous; silvery pubescence as usual. Length 8–9 mm.

♂.—Very much like the ♂ *tumidus;* differs by the strongly and more closely punctured mesopleuræ; flagellum decidedly shorter and stouter; head and dorsulum more strongly punctured; and the tibial shield is darker and narrower, being distinctly longer than broad; the form is narrower and more lengthened; markings about the same, except they are narrower on the abdomen, those on pronotum and scutellum sometimes wanting, the metanotum always maculate, however; first abdominal segment longer than in *tumidus* ♂; femora entirely black. Length 8–9 mm.

Texas; Arizona. The coarser and closer sculpture of mesopleuræ will aid in distinguishing this from the two preceding species. The ♂ specimens are placed here with some doubt. The males resemble those of *C. peltista* Kohl from Mexico, but the first joint of anterior and medial tarsi is shaped differently.

54. **Crabro tumidus** Pack.

Thyreopus tumidus Packard, l. c., p. 365. ♂ ♀.

Crabro tumidus Kohl, l. c., p. 585.

♀.—Head closely punctured; lateral impressions of vertex deep; space between eyes beneath at base of clypeus somewhat less than the length of the pedicellum and first joint of flagellum united; pronotum on each side before the anterior margin strongly furrowed, thus forming a short anterior ridge, which terminates laterally in a strong tooth; punctures of dorsulum and scutellum more or less separated; mesopleuræ with large, shallow, scattered punctures, not striate; middle segment about as in *tenuiglossus*, but the sculpture of posterior face coarser, and the large medial fovea of upper face more elongate, the posterior face is also much more widely channeled, and its lateral ridges shorter; first abdominal segment elongate, tumid at apex. Black; mandibles except apex, scape, two spots on pronotum, tubercles, metanotum, a spot on scutellum sometimes, the tips of all the femora more or less, tibiæ except within, an elongated spot on each side of dorsal abdominal segments 2–4, a smaller spot on each side of the fifth, which has sometimes a medial spot, connecting by a narrow line with the laterals, yellow; tarsi yellowish testaceous; silvery pubescence in the usual situations, and abdomen with sericeous pile as in *tenuiglossus;* wings pale subhyaline, darker apically, strongly iridescent. Length 8–9 mm.

♂.—Antennæ shorter and stouter than in the ♂ of *tenuiglossus*; punctures of dorsulum well separated; otherwise somewhat more coarsely sculptured than the ♀; colored and marked the same, except that the fore femora are yellow beneath, and there is a dark spot on scape posteriorly, which is visible from the front; wings slightly darker and without darker apical margins; tibial shield not much longer than broad, brownish, with several sinuous, pale stripes, at base yellow; pronotum and first abdominal segment with or without spots. Length 8 mm.

Illinois; New York; Pennsylvania; Delaware. A slenderer form than *tenuiglossus*.

55. **Crabro tenuiglossus** Pack.

Crabro tenuiglossa Packard, Proc. Ent. Soc. Phila., vi, p. 98, ♀.
Thyreopus discifer Packard, l. c., p. 363, ♂.
Thyreopus tenuiglossus Provancher, Add. Hym. Quebec, p. 292.
Crabro tenuiglossus Kohl, l. c., p. 585.

♀.—Head finely and closely punctured; lateral impressions of the vertex broad and very shallow; space between eyes beneath at base of clypeus about equal to the length of the pedicellum and first joint of flagellum united, at any rate not less; lingua large, prominent, greatly lengthened; pronotum not strongly furrowed on each side anteriorly, the lateral teeth small, but distinct and sharp; dorsulum and scutellum with rather coarse, compact punctures; mesopleuræ with rather large, shallow, scattered punctures, and in addition with a fine striation; middle segment above with a large, hexagonal fovea in the middle and several smaller ones on each side, the posterior face transversely rugose apically; first abdominal segment broad, slightly tumid at apex. Black, including the mandibles; scape, two sinuate spots on pronotum, sometimes broken into four dots, tubercles, metanotum, tips of anterior and medial femora, tibiæ except a black spot on inner side of fore and medial pairs and a testaceous mark at apex of hind pair, an elongated transverse spot on each side of dorsal abdominal segments 2 5, and sometimes a lateral dot on the first segment yellow, the marks on segments 2 and 3 broadest, and that on segment 4 narrowest; fore and medial tarsi testaceous, hind pair blackish; clypeus, inner orbits broadly, cheeks and thorax beneath with silvery pubescence; abdomen with a sericeous pile, more obvious on segment 5; wings subhyaline, faintly iridescent, nervures and stigma pale testaceous. Length 8 mm.

♂.—Resembles the ♀: lateral impressions of vertex stronger, but not deep; thorax more coarsely punctured, but essentially the same; medial tarsi rather distinctly flattened; tibial shield decidedly longer than broad, obtusely rounded anteriorly and posteriorly, brownish, mottled with darker yellow at base; colored like the ♀, but the fore and middle femora are yellow beneath, and there is quite a prominent yellow spot on each side of first abdominal segment; mesosternum with tolerably long, dense, white hair beneath. Length 7–8 mm.

Illinois; South Dakota (Aldrich); Ottawa (Harrington). A much more robust form than *C. tumidus*, and is distinct in other prominent characters.

12. Group *hilaris*.

These species resemble those of the preceding group to some extent, but are easily distinguished by the almost simple fore legs and

antennæ of the males. Pronotum dentate laterally; first joint of hind tarsi sometimes longer than the length of the longer spur of tibiæ, though usually of the same length; pygidium broad, not depressed, and with appressed pubescence; male antennæ not dilated, fringed more or less beneath with long, thin pubescence, which is more evident in some species than in others; ♂ anterior legs not deformed, their femora slightly flattened, and in some species clothed with more or less long, dense, white pubescence beneath, as is also the mesosternum.

This group may be identical with *Anothyreus* Dahlb., but it differs from it in some of its characters: by the fringed antennæ and dentate pronotum.

56. **Crabro cingulatus** Pack.

Thyreopus cingulatus Packard, Proc. Ent. Soc. Phila., vi, p. 366, ♂ ♀.
Crabro cingulatus Kohl, Zool. Jahrb. (Abth. f. Syst. Geogr., etc.), iii, p. 584.

♀.—Anterior margin of clypeus broadly truncate, somewhat incurved, the lateral angles very prominent, almost tooth-like; head finely and closely punctured, the front not at all striate; space between the hind ocelli slightly less than that between them and the nearest eye-margin (in the other species of the group it is greater); first joint of the flagellum a little shorter than the second; pronotum well developed above, not strongly dentate laterally; dorsulum closely punctured, more strongly so than the head; episternum mesopleuralis punctato-striate; episternum and epimerum mesothoracis finely punctured, much more finely so than the mesopleuræ, in fact they appear impunctate; middle segment above and on posterior face covered with very strong, irregular ridges or folds forming large foveæ, the longitudinal central channel deep, interrupted at base of posterior face by a large, hexagonal fovea, on the upper surface a strongly marked ridge forms a large semi-circular enclosure, at the base of which there is a transverse, foveolated furrow, sides of middle segment not striated, somewhat rugose at extreme apex; first joint of hind tarsi distinctly longer than the longer spur of hind tibiæ; abdomen closely and microscopically punctured, most distinctly beneath, pygidium coarsely and longitudinally rugose. Black; mandibles except apical third, two large spots on clypeus, which in the only specimen before me are united by a slender line, scape entirely, pronotum above, tubercles, scutellum, spot on metanotum, apical half of fore and medial femora and a line on under side, the tips of hind pair, tibiæ except a spot within on middle and hind pair, first joint of tarsi, a broad band on first dorsal segment before apex, pointed anteriorly in the middle, a large spot on segments 2 and 3, that on second segment broadest and that on third longest, a band on segments 4 and 5, that on the fifth segment twice emarginate anteriorly, and a small spot at each side of ventrals 2 and 3, yellow; apical joints of tarsi and tegulæ testaceous; clypeus, frontal depression and cheeks with silvery pubescence, that on the thorax beneath sparser and more grayish; wings subhyaline, with a yellowish tinge, nervures and stigma yellow testaceous. Length 9 mm.

♂.—Long and slender; scape compressed; flagellum distinctly fringed, first joint a little longer than the second; space between hind ocelli greater than that

between them and the nearest eye-margin; punctuation of cheeks very dense; dorsulum rather strongly punctured; episternum and epimerum mesothoracis and sides of middle segment distinctly striated; fore femora flattened toward the base, clothed with long white hair, as is also the mesosternum; fore and medial tarsi with shorter hair within, their first joint flattened; the four anterior legs are unusually slender in comparison to the hind pair, and are entirely yellow; abdomen with all the dorsal segments maculated except the last; no yellow on scutellum or postscutellum. Length 9 11 mm.

Illinois; Texas. It is in my opinion very doubtful if the two forms described by Packard and by myself above, are really sexes of the one species. They contrast remarkably when placed side by side, the short, stout form of the female and the male with its long, slender build; and moreover their character of sculpture is so different. The female seems to differ but slightly from that of *C. argus* which follows in the next group because of the characters of the ♂. This fact leads me to believe that the ♀ of *cingulatus* has yet to be discovered, and that the ♀ described above and by Packard belongs to one of the two preceding groups. Nothing definite can be determined, however, until the sexes are worked out better.

57. **Crabro cognatus** n. sp.

♀.—Head about as in *hilaris*, but is somewhat more distinctly punctured and on the front the striation is more evident; first joint of flagellum a little shorter than the two following joints united; pronotum not strongly developed above as in *hilaris*, shorter, not so distinctly dentate; punctuation of the mesopleurae coarser than in the species mentioned, and tends to punctato-striate on the episternum mesopleuralis; episternum and epimerum metathoracis more or less striated; middle segment less coarsely ridged than in *hilaris*, the foveæ consequently less marked, the central longitudinal channel above shallower, broader and widened more basally; medial and hind tibiæ and tarsi more strongly spinose; abdomen about as in *hilaris*. Black; colored as in the species mentioned, except that the episternum mesopleuralis and apical portion of the hind tibiæ is black, as are likewise all those parts which, in *hilaris*, vary from black to yellowish; ventral abdominal segments 2, 3 and sometimes 4 with a small, yellow, lateral spot; markings on first and fourth dorsal segments usually separated medially, those on the second and third always widely so; wings subhyaline, darker at apex; clypeus, cheeks, and thorax beneath more densely with silvery pubescence. Length 8 9.5 mm.

♂.—Scape of antennæ compressed, broader by far at apex than at base, widest medially, however; flagellum short, rather stout, not thickened medially, narrowed a little to the apex, distinctly fringed beneath, the first joint about one-third longer than the second; sides of middle segment coarsely striated, except medially, where they are sparsely and finely punctured (sometimes the striæ are indistinct); remainder of middle segment more coarsely sculptured than in the ♀; mesosternum clothed with long, dense, white hair, that on the base of fore femora shorter and sparser, the fore and medial tarsi with shorter and stiffer white hair within; last two dorsal segments of abdomen not strongly punctured, the ultimate

but little, if anything, more distinctly so than the penultimate; coxæ in part, trochanters, fore femora except an elongate spot behind, the medial pair except a line above and behind, hind pair beneath except apex, four anterior tibiæ and tarsi entirely, hind tibiæ at base and within, yellow; flagellum testaceous beneath; sixth dorsal segment seldom spotted with yellow. Length 7–9 mm.

Montana. The markings are remarkably constant in the forty some specimens before me.

58. **Crabro hilaris** Sm.

Crabro hilaris Smith, Cat. Hym. Brit. Mus. iv, 416, ♀.

Thyreopus cingulatus Packard (in pt.), Proc. Ent. Soc. Phila., vi, 366, ♂ ♀.

♀.—Clypeus not strongly carinated, its fore margin broadly truncate; head finely and closely punctured, most densely so on the front, which is indistinctly punctato-striate; first joint of flagellum about as long as the following two joints united; pronotum well developed above, rather long, dentate laterally; dorsulum strongly and tolerably closely punctured; episternum and epimerum metathoracis distinctly striated, though not coarsely so; middle segment above with coarse, irregular ridges forming broad foveæ, whose shape, size and prominence vary, on the posterior face these ridges are transverse, central longitudinal channel deep, but little widened basally and interrupted at base of posterior face by a large fovea, sides of middle segment, except medially, which is sparsely punctured, with fine striæ; medial and hind tibiæ strongly spinose; abdomen above, except the first segment, densely and microscopically punctured; pygidium broad, triangular, slightly convex, covered with large, separated punctures, and on apical portion densely clothed with appressed golden pubescence. Black; mandibles on basal two-thirds, clypeus except narrow apical margin, scape entirely, sometimes pedicellum, pronotum above, tubercles, episternum mesopleuralis, scutellum and a dot on each side anteriorly, two spots on metanotum (postscutellum), sometimes the coxæ and trochanters in part, tips of all the femora, particularly the fore and medial pair, tegulæ, except a spot within, the size of which varies, and which is sometimes entirely lacking, a band on the first dorsal segment before apex, two transverse spots on segments 2 and 3, narrowed within and sometimes touching, a band on segments 4 and 5, and irregular markings on ventrals 2–4, yellow; tarsi except first joint, and apex of hind tibiæ, testaceous; clypeus and thorax beneath sparsely and cheeks with silvery pubescence; color of wings varying from fuscohyaline to subhyaline, the nervures and stigma testaceous. Length 9–10 mm.

♂.—Clypeus narrower than in the ♀, its fore margin truncate and dentate laterally; flagellum tolerably slender, somewhat subclavate, indistinctly fringed with hair beneath; dorsulum more strongly punctured, towards the sides punctato-striate; middle segment more coarsely ridged; first joint of hind tarsi, compared with the longer spur of hind tibiæ, a little longer; last two dorsal segments of abdomen strongly punctured, the ultimate more distinctly so than the penultimate; in addition to the markings of the ♀, the first two or three joints of the flagellum, the femora except a dark spot on outer side, four anterior tibiæ entirely, and greater part of abdominal segments 1 and 2, yellow; the markings on dorsal segments 5 and 6 sometimes obsolete; wings subfuscous. Length 7–10 mm.

Florida: St. John's Bluff (Smith), St. Augustine (Johnson), Jacksonville (Ashmead); Texas; Illinois. An examination of the

types of *Thyreopus cingulatus* reveals that Packard had confused *hilaris* with that species. He remarks, on p. 357, that the ♀ described by him is referred doubtfully to *cingulatus* on account of the difference in coloration. Strange to say, however, one of the original types of the ♀ does not possess the color marks about which Packard speaks, and belongs to *cingulatus*

13. Group *nitidiventris*.

Pronotum above large, convex, not crested, rounded at the sides; middle segment above divided into two smooth convexities; ocelli in an almost equilateral triangle; pygidium (♀) narrowed apically strongly depressed or excavated; wings in all our species with several dark spots; abdomen, as in the two preceding groups, spotted; antennæ and fore legs of males simple.

This group represents in America the genus *Blepharipus* St. F. et Br.

59. **Crabro maculipennis** Sm.

Crabro maculipennis Smith (not *Bleph. maculipennis* Packard), Cat. Hym Brit. Mus. iv, 417.

♀.—Head more distinctly and less closely punctured than in *confertus*, particularly the front and vertex, and appears more transverse than in that species, impressed line running from frontal depression to fore ocellus strong and wide; pronotum at the sides sub-rounded, and short; dorsulum punctured like the vertex; scutellum sparsely punctured anteriorly, more closely so on posterior portion; episternal suture of mesopleuræ very heavily foveolate, more so than in *confertus*; base of the enclosure of middle segment with the usual transverse row of large foveæ, the central furrow broadened basally, longitudinally ridged, the outer furrow forming the enclosure much more heavily foveolated than in the species mentioned above, posterior face coarsely rugose apically, the lateral ridges strong and margined outwardly by a strongly foveolated furrow; abdomen finely and sparsely punctured above, except the first segment, which is impunctate, and, excluding the pygidium, the punctures are most distinct and closest on fifth segment; pygidium as usual. Black, including the mandibles and episternum mesopleuralis; scape entirely, pronotum, tubercles, line on scutellum anteriorly, spot on each convexity of the enclosure of middle segment, tips of fore and medial femora, tibiæ except within and apex of hind pair, first joint of tarsi, a transverse spot on each side of dorsal abdominal segments 2–4, and a band on the fifth, somewhat narrowed medially, pale yellow; clypeus and inner orbits beneath with dense, silvery pubescence, that on the cheeks sparser; wings as in *confertus*, but the dark spots are more distinct; head and thorax above with pale fuscous pubescence, that on thorax beneath pale. Length 11 mm.

♂.—Front and vertex more coarsely punctured; greater part of fore femora, spot on each side of the sternum, anteriorly and two spots on clypeus, pale yellow; dark spots on wings very strongly marked. Length 10 mm.

Franconia, New Hampshire (Mrs. Slosson). The markings are much paler in this species than in the others of the group, and the head, particularly in the female, is more transverse. From what Packard states regarding the variability of the specimens of his *maculipennis*, it seems to me that he had confused more than one species.

60. **Crabro confertus** n. sp.

Blepharipus maculatus St. Farg. and Brullé (not Fabr.), Ann. Soc. Ent. Fr. ii, 730, 1834.

Crabro (Blepharipus) maculatus Dhlb., Hym. Eur. i, 344.

Blepharipus maculipennis Pack. (non *Crabro maculipennis* Sm.), Proc. Ent. Soc. Phila., vi, 372, ♀ ♂.

♀.—Clypeus of the usual form in this section; head finely and closely punctured, more finely on the cheeks, posterior lateral angles rounded, not prominent; hind ocelli placed in shallow depressions, which are not so distinct as in *nitidiventris*, and the impressed line running from frontal depression to fore ocellus is not quite so deep as in that species; pronotum less rounded at the sides than in the species above mentioned, and is shorter; dorsulum closely punctured like the vertex, scutellum a little more sparsely so; episternal suture of mesopleuræ distinctly foveolate; enclosure of middle segment with a broad, transverse, heavily foveolated furrow at base, the central longitudinal channel broadened basally and longitudinally ridged (or as Packard puts it, "the furrow widens toward the base of the enclosure so as to include two of the fossæ"), the furrow bounding the enclosure outwardly also foveolate, but not so strongly so as the basal furrow, posterior face of middle segment not rugose apically, except, perhaps, the extreme apex, the lateral ridges extending up somewhat above the middle, the outer furrow distinct, but not foveolate; abdomen finely and closely punctured above, sparsely so on first segment; pygidium somewhat more coarsely punctured. Black, including the mandibles, episternum mesopleuralis and convexities of enclosure of middle segment; two spots on clypeus, sometimes absent, scape, line on pronotum sometimes interrupted medially, tubercles, line on scutellum anteriorly, spot on tegulæ, apex of fore and medial femora, tibiæ, except a spot on inner side of anterior and middle pairs and apex of hind pair, first joint of all the tarsi, a transversely elongated spot on each side of dorsal abdominal segments 2–4 and a band on segment 5, yellow; sometimes the first segment has two small spots on first segment; sixth segment has two spots, which are, however, usually concealed through retraction of the segment; apical joints of tarsi brownish, those of the anterior pair palest; clypeus, inner orbits beneath and cheeks with silvery pubescence; head and thorax with a sparse, pale fuscous pubescence, longest above; wings subhyaline, with a faint yellowish tinge basally, nervures yellow testaceous, stigma black, the spot in marginal cell scarcely evident. Length 9–10 mm.

♂.—Mandibles except base and apex, pedicellum and joints 1 and 2 of flagellum beneath yellow, a spot on each side of the mesosternum anteriorly and on each side of third ventral segment of abdomen also yellow (sometimes the mandibles are black and the spots on mesosternum and ventral surface of abdomen are wanting); scutellum either entirely black or with a yellow stripe, or two dots of that color; yellow on pronotum sometimes wanting; fore femora entirely yellow

beneath; the ♂ differs principally from that of the following species, *maculipennis*, by the less strongly foveolated episternal suture of mesopleuræ and the non-foveolated furrows, that bound the lateral ridges of the posterior face of middle segment outwardly; spot in marginal cell much more distinct than in the female. Length 8 mm.

Colorado. *Confertus* agrees better with the description of *maculatus* St. Farg. (non Fab.) than does the preceding species, but is evidently different from the species to which Smith gave the name *maculipennis*, that author stating that *maculatus* St. Farg. "is quite distinct from the *maculatus* of Fabricius." The specimens which Smith possessed at the time of renaming *maculatus* St. Fargeau, according to Smith's remarks regarding them, also appear different from St. Fargeau's, so that it seems to me that *confertus* probably represents the *maculatus* of St. Fargeau and the *maculipennis* of Packard (not Smith) and that Smith's *maculipennis* is a different species. It is possible that *nitidiventris* is Packard's *maculipennis*, but that author makes no mention of the yellow spots on middle segment which are constant in the specimens of the former species before me. It is a question to be settled by the examination of either the types of St. Fargeau and Smith.

61. **Crabro nitidiventris** Fox.

C. nitidiventris Fox, Entom. News, iii, 9, ♀.

♀.—Clypeus dentate, as in *ventralis;* head shining, with distinct, separated punctures, those on the cheeks and occiput finest, the posterior lateral angles not prominent, rounded; posterior ocelli situated in broad, though not deep, depressions; furrow running from frontal depression to fore ocellus deep; pronotum well developed, but not strongly so as in *ventralis;* dorsulum with distinct, separated punctures, somewhat closer than those of the front and vertex, shining; scutellum finely punctured; episternal suture of mesopleuræ distinctly foveolated; foveolated furrows bounding the enclosure of middle segment not so broad as in *ventralis*, and the longitudinal central channel is transversely ridged, posterior face transversely rugose apically, the lateral ridges distinct on posterior half only, and on their outer side is a heavily foveolated furrow, which extends the entire length of the posterior face; medial and hind tibiæ more finely spined than in the species mentioned above; abdomen shining, with exception of the first dorsal and the ventral segments, which are impunctate, finely and somewhat sparsely punctured, pygidium with large, sparse punctures; these are more or less variable, however. Black, including the mandibles and ventral surface of abdomen; two spots on clypeus, scape and pedicellum, line on pronotum sometimes interrupted medially, tubercles, episternum mesopleuralis, dot on tegulæ, basal half of scutellum, spot on each convexity of the enclosure of middle segment, tips of fore and medial femora, tibiæ except a spot at apex of medial and hind pairs, tarsi except apical joints, which are brownish, and a transversely elongated macula on each side of dorsal abdominal segments 2–5, yellow; greater part of tegulæ reddish testaceous; clypeus, inner orbits beneath and cheeks with silvery

pubescence; head and thorax above with a short, pale fuscous pubescence, that on the thorax on sides and beneath sparse and pale; wings hyaline, slightly tinged with yellowish basally and along costa, and a small fuscous dot in the marginal, at the apex of its appendiculation, and at apex of the submarginal cell, stigma black, nervures brownish. Length 10–11 mm.

♂.—Clypeal teeth a little more prominent than in the ♀; posterior face of middle segment more rugose, the longitudinal, central furrow stronger and longer, lateral ridges better developed and extending farther and margined outwardly by a strongly foveolated furrow; episternal suture of mesopleuræ more strongly foveolate; head and thorax more closely punctured; greater part of fore femora, spot on each side of the sternum anteriorly sometimes wanting and joints 1–3 or 4 of flagellum beneath, yellow. Length 9 mm.

New Jersey in July; District of Columbia (Ashmead); Illinois: Algonquin (Nason). The shining body, widely separated maculæ on abdomen and punctuation of head and thorax sparser than in other species will effectively distinguish this species.

62. **Crabro ventralis** n. sp.

♀.—Anterior margin of clypeus with an indistinct tooth medially, and with a somewhat more prominent one on each side; head finely and very closely punctured, the posterior lateral angles more prominently angular than usual when viewed from the side; furrow running from the frontal depression to the fore ocellus distinct, but not very strong; pronotum strongly developed above, appearing as a large, transverse fold or swelling; dorsulum punctured about like vertex, perhaps a little more strongly so; scutellum more finely and sparsely punctured; episternal suture of mesopleuræ scarcely foveolate; enclosure of middle segment with a strong, transverse foveolated furrow at base, the width of which varies somewhat, the central longitudinal channel is also variable in width, and has one or more longitudinal ridges, posterior face rugose at apex, the lateral ridges only distinct on apical half, obsolete above; middle and hind tibiæ with short, strong spines; abdomen above very finely punctured, most sparingly so on first dorsal and beneath; punctuation of pygidial area variable, sometimes with large, coarse punctures and again impunctate. Black; mandibles except apex, two spots on clypeus, scape entirely, pedicellum beneath, pronotum above, a spot on the dorsulum at each side anteriorly, scutellum and a small spot at each antero-lateral angle, a spot on each convexity of the enclosure of middle segment, tubercles, most of tegulæ, episternum mesopleuralis, spot at apex of coxæ, trochanters (the coxæ and trochanters are sometimes black), tips of the femora, the anterior and medial pairs most broadly, the tibiæ, except a spot at apex of hind pair, one or two (or three) basal joints of tarsi, a transverse band on dorsal abdominal segments 1–5 and the greater part of ventrals 2–5, yellow; clypeus, inner orbits beneath and cheeks with a silvery pubescence, not dense, however; wings with a yellow tinge, nervures yellow testaceous, stigma black; thorax beneath with a short, pale fuscous, sparse pubescence. Length 9–10 mm.

Nevada. The coloration will distinguish this from the other species of the group.

14. Group *pinguis*.

Ocelli forming a curved line; mandibles simple, pointed at apex, not dentate; both sexes with a pygidium, which is broad, flat, not depressed or excavated; fore tarsi not flattened in ♂.

Beginning with this group all the species following have the abdomen immaculate. Group *pinguis* is the only one of *Crabro* having the mandibles not dentate at apex and in which the males are furnished with a pygidial enclosure; in these characters the group approaches the genera *Entomognathus* and *Anacrabro*, but is otherwise distinguished. It represents *Lindenius* St. F. and Br.

63. **Crabro errans** n. sp.

♀.—Anterior margin of clypeus rounded out, indistinctly dentate laterally; head a little more finely punctured than in *latifrons;* fore ocellus situated in a strong depression, the furrow running from it to the frontal depression well marked, but not so broad as in the species mentioned above; the space between the fore and posterior ocelli is less than that between the posteriors and the nearest eye-margin, but not so much as in *latifrons;* furrow leading from each posterior ocellus to the inner orbit very distinct; space between eyes beneath, at their nearest point of convergence, about equal to a little more than half the length of the scape; first joint of flagellum a little longer than the second; dorsulum more distinctly punctured than the front; enclosure of middle segment well marked, at the base with a transverse, foveolated furrow, from which extend some longitudinal, coarse striæ, so that there appears to be a semi-circular, depressed, coarsely striated area at the base of the enclosure, beyond these striations the enclosure is smooth, shining; furrow forming the enclosure heavily foveolated; posterior face of middle segment rugose apically, the lateral ridges distinct, these margined by a furrow on each side, the outer being distinctly foveolate; length and shape of abdomen apparently variable; in some specimens about as long as head and thorax united and elongate-ovate, again distinctly shorter than those parts and broadly ovate; pygidium rather acute at apex, flat, not depressed. Black; mandibles, except apex, scape in front, pronotum above, tubercles, spot on scutellum, sometimes absent, tips of fore femora, anterior and medial tibiæ, except a line within, the basal portion of hind tibiæ, and basal joint of all the tarsi yellow, remaining joints of tarsi brownish, those of the hind pair blackish; flagellum beneath testaceous; clypeus, inner orbits beneath, cheeks and thorax on sides and beneath, with silvery pubescence; legs and abdomen with a silvery sericeous pile. Length 3.5–4.5 mm.

♂.—First joint of flagellum distinctly longer than the second; cheeks unarmed; otherwise as in the female. Length 3–3.5 mm.

Colorado (Gillette); Las Cruces, New Mexico (Cockerell); Illinois (Robertson); District of Columbia; Pennsylvania (Johnson). The Illinois specimens are the smallest and seem to differ slightly in the sculpture and may be another species. *C. errans* may be the *C.* (*Lindenius*) *columbianus* Kohl, but I cannot determine satisfactorily, from the description, whether it is that species or not.

64. **Crabro latifrons** n. sp.

♀.—Anterior margin of clypeus rounded out, not dentate laterally; punctures of the front and vertex finer and not so close as in *flaviclypeus*, the occiput punctured about the same; fore ocellus situated in a strong depression, the furrowing running from it to the frontal depression wide and deep, more strongly marked than in the species mentioned above; space between the anterior and posterior ocelli is decidedly less than that between the posteriors and the nearest eye-margin; space between the eyes beneath, at their nearest point of convergence, about equal to five-sixths the length of the scape; first joint of flagellum but little longer than the second; dorsulum less closely punctured than the front; enclosure of middle segment distinct, parted by a distinct, longitudinal furrow, which is broadened basally, each half obliquely striated, at the base a heavily foveolated, transverse furrow; abdomen as long as head and thorax united; pygidium about as usual in this section. Black, including the clypeus; basal half of mandibles, scape in front, broadly interrupted line on pronotum above, tubercles, spot on scutellum, tips of all the femora, especially the anteriors, the tibiæ except a spot within and the tarsi, except last two joints, pale yellow; flagellum testaceous beneath; tip of abdomen reddish; clypeus, inner orbits beneath, cheeks and thorax on sides and beneath with dense silvery pubescence; legs and abdomen with a silvery sericeous pile. Length 4.5 mm.

Texas. Distinct in the greater space between the eyes beneath and between the hind ocelli and the nearest eye-margin as compared with that between the fore and hind ocelli.

65. **Crabro armaticeps** n. sp.

♂.—Clypeus not carinated, its anterior margin truncate, not dentate laterally; head with finer punctures than in the preceding species, those of the front and vertex strongest; cheeks beneath armed with a short, stout spine; a well-marked impressed line extends back from the fore ocellus; anterior ocellus situated in a strong depression, the furrow extending from it to the frontal depression, strong; furrow running from each hind ocellus to the inner orbit distinct; space between the eyes beneath at their nearest point of convergence equal to about four-fifths the length of the scape; dorsulum punctured about like the front and vertex; enclosure of middle segment distinct, divided by a broad, shallow channel, which is narrowed posteriorly, and does not extend to the apex of enclosure, at the base with a heavily foveolate, transverse furrow, otherwise the enclosure is obliquely striated, lateral ridges of posterior face distinct and with an outer and inner foveolated furrow; abdomen shorter than head and thorax united, last dorsal segment strongly punctured. Black; mandibles, except apex, scape entirely, pedicellum beneath, pronotum above, tubercles, scutellum, tips of all the femora, all the tibiæ, except a dark spot within, and the tarsi, except extreme apex, yellow; flagellum testaceous, palest beneath; last abdominal segment reddish; clypeus, inner orbits, cheeks and thorax on sides and beneath, with silvery pubescence; remainder of insect with a silvery sericeous pile, especially the abdomen; wings hyaline iridescent, nervures testaceous. Length 4 mm.

Texas. This will probably prove to be the male of *flaviclypeus*, or else *latifrons*.

66. **Crabro flaviclypeus** n. sp.

♀.—Anterior margin of clypeus truncate in the middle with a distinct tooth on each side; head distinctly punctured, most strongly on front and vertex, and finest on occiput; furrow running from each hind ocellus to the inner orbits and depression in which the fore ocellus is situated, not so distinct as in *pinguis;* a tolerably well-marked furrow extends back from the fore ocellus; space between the eyes beneath, at their nearest point of convergence about equal to two-thirds the length of the scape; first joint of flagellum somewhat shorter than the second; dorsulum a little more finely punctured than the front and vertex; enclosure of middle segment divided by a very wide, longitudinal channel, which is wider by far than the transverse row of foveæ at the base, the two convexities obliquely striated, posterior face rugose apically, the lateral ridges strong and with a finely foveolated furrow on each side; abdomen fully as long as the head and thorax united; pygidium triangular, flat, not depressed. Black; clypeus, scape entirely, pedicellum beneath, pronotum above, tubercles, spot on scutellum, tips of all the femora, especially the anterior pair, all the tibiæ except an elongate, black spot within and the tarsi, except one or two apical joints, yellow; flagellum beneath testaceous; clypeus, inner orbits beneath, cheeks, and thorax on sides and beneath with dense silvery pubescence; abdomen and legs with a silvery sericeous pile; wings hyaline, iridescent. Length 5 mm.

Colorado (Gillette); Montana. It is a much more slender species than *pinguis*, and is farther distinguished from that species by the yellow clypeus, greater abundance of silvery pubescence, etc.

67. **Crabro pinguis** n. sp.

♀.—Anterior margin of clypeus truncate in the middle, not or indistinctly dentate laterally; head large, rather longer than usual, strongly punctured on the front, more finely so posteriorly; a broad, though not deep, furrow runs from each hind ocellus to the inner orbits; fore ocellus in a strong depression, the impressed line, which extends from it to the frontal depression, well marked; space between the eyes beneath, at their nearest point of convergence about equal to a little more than half the length of the scape; first joint of flagellum about one-third longer than the second; pronotum at the sides with a blunt tooth; dorsulum more distinctly punctured than the occiput, but less coarsely so than the front and vertex; episternal suture of the mesopleuræ slightly sinuous, nearly straight; middle segment with the enclosure well marked, within it is obliquely striated and at the base with a depression, which is angular behind in the middle and longitudinally ridged; posterior face rugose apically; medial and hind tibiæ tolerably spinose; abdomen shorter than head and thorax united, pygidium triangular, rather acute at apex, not depressed. Black, including the scutellum; mandibles except apex, scape in front, pronotum above, tubercles, tips of fore femora, fore and medial tibiæ in front, hind tibiæ at base, two basal joints of fore and medial tarsi (the remaining joints brownish), and basal joint of hind tarsi, yellow; joints 2–5 of hind tarsi, blackish; clypeus, inner orbits below, broadly, with silvery pubescence; this pubescence is almost lacking on the cheeks and sides of thorax; abdomen and legs with a silvery sericeous pile. Length 5 mm.

State of Washington. In the specimen before me the mandibles have the appearance of being worn away, and are so short that when closed they do not touch, and the space between them would indicate an impairment of over one-third.

15. Group *minimus*.

Pygidium (♀) broad, flat, not excavated; ocelli forming an equilateral triangle; fore tarsi (♂) not flattened, the ultimate abdominal segment in that sex more strongly punctured than the penultimate; pronotum crested transversely.

This group is identical with *Crossocerus* St. F. and Br.

68. **Crabro sulcus** n. sp.

♀.—Anterior margin of clypeus as in *incavus;* head finely punctured, the front more distinctly; a distinct, impressed line runs back from the fore ocellus; first joint of antennæ less than one-third longer than the second; pronotum rather sharply crested, at the sides obtusely angular; punctures of the dorsulum somewhat finer and more separated than those of the front; episternal suture of mesopleuræ sinuous; excavated basal portion of middle segment represented by a strongly foveolated furrow, the longitudinal furrow of upper surface broad basally, and much narrowed apically; all the impressed lines or furrows of middle segment foveolate, except the longitudinal medial furrow of posterior face, the lateral ridges of the latter with an inner and outer furrow, upper surface, outside the enclosure, rather coarsely striated; abdomen shorter than head and thorax united, the first segment not meeting evenly with the second in consequence of being slightly contracted at apex; pygidium narrower at apex than in *incavus*, flat as usual, with large, scattered punctures. Black; apical portion of mandibles reddish; scape in front, two small spots on pronotum, fore tibiæ in front and extreme base of medial and hind tibiæ, yellowish; rest of legs and tegulæ, brownish testaceous; clypeus, cheeks, sides of thorax and beneath sparsely, with silvery pubescence; legs and abdomen with a silvery sericeous pile; wings hyaline, iridescent, nervures and stigma brownish. Length 5 mm.

Beverly, Massachusetts, July 13. From *incavus* this species differs chiefly by the metathoracic characters and form of pygidium. The color of legs is a good superficial character in distinguishing it. A male specimen from Long Island, received from Mr. Ashmead, I refer doubtfully to this species. The pronotum is very strongly angular at the sides and strongly crested above and the base of the middle segment is broadly excavated, somewhat as in *incavus*, and longitudinally marked with short striæ; the mandibles are yellow. Otherwise it resembles *incavus* very much.

69. **Crabro pictipes** n. sp.

♂.—Head finely punctured, the front more distinctly so, but the difference is not so marked as in some of the following species; antennæ rather long, not at all clavate, the first joint of flagellum but little, if anything, longer than the second; pronotum rather strongly crested above, laterally angulate, though not acutely; dorsulum finely and closely punctured; episternal suture of mesopleuræ obtusely angular at about the middle; middle segment fully as broad as in *incavus*, coarsely striated and the medial, longitudinal furrow, which is very broad at base, assumes a somewhat triangular form; fore tarsi slightly flattened.

but not dilated, hind and medial tibiæ but feebly spinose; abdomen longer than head and thorax united, last dorsal segment most strongly punctured. Black; scape entirely, clypeus, mandibles, palpi and surrounding parts, pronotum, tubercles, spot on scutellum, prosternum, mesosternum anteriorly, fore and medial coxæ and trochanters, fore femora, except a line behind, medial femora in front and a medial stripe behind, fore and medial tibiæ, except a stripe within, hind tibiæ basally and on inner side, fore and medial tarsi and greater part of hind pair, bright yellow; clypeus with silvery pubescence; thorax beneath with pale pubescence; abdomen with a sparse, silvery sericeous pile. Length about 6 mm.

Nevada (Morrison). May be the ♂ of *incavus*, but the fact of color markings being so strikingly different induces me to consider it as different.

70. **Crabro incavus** n. sp.

♀.—Anterior margin of clypeus indistinctly dentate laterally, with a medial production; head finely punctured, the front less strongly than in the other species of this section; space between hind ocelli somewhat less than that between them and the nearest eye-margin; a distinct impressed line runs back from the fore ocellus; first joint of flagellum nearly one-third longer than the second; pronotum indistinctly crested, at the sides obtusely angular; dorsulum with the punctures less close than those of the front; episternal suture of mesopleuræ sinuous; middle segment with the basal excavated portion including at least one-half of the enclosed area and with coarse, somewhat radiating striæ, the medial furrow of upper surface broad, with a few transverse striæ basally, posterior face not striated or roughened, the lateral ridges distinct, particularly beneath, their outer furrow not foveolated or strongly marked; abdomen about as long as head and thorax united, at any rate not longer, microscopically punctured, the first segment almost evenly united with the second; pygidium with large, scattered punctures. Black; mandibles apically, reddish; scape in front, line on pronotum, tubercles, minute spot on scutellum, fore and medial femora at tips, anterior tibiæ in front, the remaining pairs basally, first two joints of fore and medial tarsi and first joint of hind tarsi, except apex, yellowish; clypeus, inner orbits beneath, cheeks and thorax on sides and beneath sparsely, with silvery pubescence; legs and abdomen with a sparse, silvery sericeous pile; wings subhyaline, paler basally, iridescent, nervures brownish. Length 5.5 mm.

Colorado (Morrison). The characters of the metathorax distinguish this species at once from its allies.

71. **Crabro minimus** Pack.

Blepharipus minimus Packard, Proc. Ent. Soc. vi, p. 377, ♀ ♂.

♀.—Anterior margin of clypeus dentate laterally and with a distinct prominence medially; head punctured as usual in species of this section; no impressed line extending from fore ocellus to occiput; first joint of flagellum distinctly longer than the second; pronotum narrowly crested, at the sides angular; punctures of mesopleuræ a little stronger and more separated than those of the dorsulum, the episternal suture a little curved; basal excavation of middle segment well marked, and, with the lines forming the enclosure, foveolate, the longitudinal furrow, however, not foveolate, the convexities within the enclosure microscopically striated as in *propinquus*, posterior face apparently finely roughened, or

transversely striated, the sides of middle segment finely striated, sometimes smooth; abdomen slightly shorter than head and thorax united; pygidium with large, scattered punctures. Black; mandibles except apex, scape in front, pronotum above, tubercles, tips of anterior femora, fore and medial tibiæ, except within, base of hind pair, fore tarsi except apical joints, and first joint of hind tarsi at base, yellow; face, cheeks and sides of thorax with silvery pubescence. Length between 4 and 5 mm.

Brunswick, Maine (Packard) in August; Massachusetts; District of Columbia (Ashmead); Michigan. In the specimen before me from Massachusetts, which I believe was identified by Packard, although evidently not one of the types, the pronotum is angular at the sides. In the original description the pronotum is said to be "not angulated at the sides." While I believe the specimens before me to be *minimus*, yet they may be distinct. I have not seen the ♂, which seems to be much like the ♀, except that the fore femora are said to be yellow beneath.

72. **Crabro propinquus** n. sp.

♀.—Anterior margin of clypeus slightly dentate laterally, with a median prominence; head finely punctured, the front most distinctly so; space between hind ocelli slightly less than that between them and the nearest eye-margin; a faintly impressed line extends from the fore ocellus to the occiput; first joint of flagellum more than one-quarter longer than the second; pronotum well crested, angular at the sides; dorsulum punctured like the front, except that the punctures are not so close; mesopleuræ a little more distinctly punctured than the dorsulum, its episternal suture obtusely angular in about the middle; all impressed lines of middle segment foveolate, except the large, central channel on posterior face, the two convex surfaces within the enclosure are microscopically striated, these striæ are so fine as to be difficult to see, except when the insect is held in certain positions, and are oblique, posterior face with fine though distinct, transverse striations, the lateral ridges distinct; abdomen shorter than head and thorax; pygidium flat, with large, separated, though not sparse, punctures. Black; mandibles except apex, scape beneath, pronotum, tubercles, tips of fore femora, fore and medial tibiæ, except a line within, hind tibiæ at base, and tarsi except apical joints, yellow; wings hyaline, iridescent, nervures and stigma black; clypeus, inner orbits beneath, cheeks, and sides of thorax more sparsely, with silvery pubescence; abdomen with a sparse, silvery sericeous pile. Length 5 mm.

Texas (Birkman). It is somewhat larger than *minimus*, although closely related.

73. **Crabro maculiclypeus** n. sp.

♀.—Anterior margin of clypeus subtruncate, not dentate; head finely punctured, as usual the punctation of front most distinct; first joint of flagellum about one-quarter longer than the second; pronotum well crested, more so than in *lentus*, but less than in *scutellatus*, the lateral angles obtuse; dorsulum apparently more finely and less closely punctured than the front; episternal furrow of mesopleuræ

sinuous; middle segment very much as in *lentus*, but the longitudinal, medial, impressed line is not foveolate; abdomen a little shorter than head and thorax united, microscopically punctured, narrower than in *lentus*, the first segment narrower and longer; pygidium flat, with large, sparse punctures. Black; mandibles, except apex, scape in front, two spots on clypeus, pronotum, tubercles, scutellum, tips of fore and medial femora, fore and medial tibiæ except within, basal portion of hind tibiæ, two basal joints of fore and medial tarsi and first joint of hind pair yellowish, the apical joints of the fore and medial tarsi yellow testaceous; clypeus, inner orbits beneath, cheeks and sides of thorax sparsely, with silvery pubescence; abdomen with a rather distinct, silvery sericeous pile; apex of pygidium reddish, antennæ beneath pale testaceous. Length 4.5–5 mm.

♂.—Anterior margin of clypeus dentate laterally, and with a medial prominence; first and second joints of flagellum about equal in length; head more finely punctured than in the ♀; abdomen somewhat clavate, the last segment with large, coarse punctures; otherwise very much like the ♀.

Colorado (Morrison and Gillette); Utah. The yellow mandibles, spots on clypeus serve, superficially, to separate this species from *lentus*. Mr. Johnson has given me a specimen collected in either Pennsylvania or New Jersey, probably the latter State.

74. **Crabro lentus** n. sp.

♀.—Anterior margin of clypeus with a small, indistinct tooth laterally and in the middle; head more finely punctured than in *scutellatus*, the punctures on front most distinct, while those on cheeks and upper part of head behind eyes are indistinct; antennæ tending toward subclavate, the first joint of flagellum about one-quarter longer than the second; pronotum tolerably well crested above, but less so than in *scutellatus*, lateral angles obtuse; dorsulum punctured similarly to the vertex; episternal suture of the mesopleuræ not angulated, but forming a slight curve; middle segment with the transverse furrow at base, the lines forming the enclosure, and the longitudinal medial furrow, all strongly foveolated, along side the lateral ridges of posterior face, both inside and outside, there is a strong foveolated furrow and towards the top of the sides of middle segment there is another, somewhat oblique, foveolated furrow; abdomen shorter than head and thorax united, rather broadly ovate, microscopically punctured, the first segment short and broad; pygidium with large, sparse punctures. Black; mandibles except base and tegulæ reddish testaceous; scape in front, pronotum, spot on scutellum, which varies in size, fore and medial tibiæ except a line within, basal portion of hind tibiæ and two or three basal joints of the tarsi, yellowish; wings hyaline, iridescent, nervures brownish; clypeus, inner orbits beneath, cheeks and sides of thorax sparsely, with silvery pubescence. Length 4.5–5 mm.

Algonquin, Illinois (Nason); Utah; Jacksonville, Florida (Ashmead). One specimen lacks the yellow on scutellum.

75. **Crabro scutellatus** Say.

Crabro scutellatus Say, Long's Second Exped., Appendix, p. 341.*

♀.—Anterior margin of clypeus rather broadly rounded out; head finely, though distinctly punctured, the punctuation of the front being especially promi-

* See remarks under *C. impressifrons* regarding this species.

nent, while that on the cheeks is indistinct; impressed line extending from frontal depression to the fore ocellus deep; antennæ tolerably slender, the flagellum not at all clavate, its first joint scarcely one-quarter longer than the second; pronotum strongly crested above, the lateral angles obtuse; dorsulum punctured about like the vertex, strongly convex; mesopleuræ more distinctly punctured, its episternal suture rather distinctly angulated a little above the middle; base of middle segment with a transverse, foveolated furrow, the impressed lines forming the enclosure distinct, as is also the longitudinal, medial line; posterior face divided by a deep and broad, longitudinal channel, not roughened, lateral ridges becoming obsolete above; medial and hind tibiæ not strongly spinose; abdomen somewhat longer than head and thorax united, microscopically punctured above, impunctate beneath, the first segment decidedly narrowed basally, tending a little in form to subpetiolate; pygidum with coarse, scattered punctures. Black; mandibles and tegulæ testaceous; scape in front, a continuous stripe on pronotum and tubercles, scutellum, tips of fore and medial femora, medial and anterior tibiæ except a line on inner side; basal third of hind tibiæ and two first joints of the tarsi, yellowish; wings hyaline, iridescent, nervures and stigma brownish; clypeus, inner orbits, cheeks and sides of thorax sparsely, with silvery pubescence. Length 6 mm.

Pennsylvania (Say); Colorado. The specimen before me agrees tolerably well with Say's description, particularly regarding the yellow of pronotum, which is connected with that of the tubercles. I should think, however, that this is apt to vary.

76. **Crabro similis** n. sp.

♀.—Anterior margin of clypeus truncate medially, very slightly or not at all dentate laterally; head finely punctured, the front and vertex more closely so than the region behind the ocelli; depression extending upward from frontal depression not strongly marked, almost obliterated before the anterior ocellus; space between hind ocelli decidedly less than that between them and the nearest eye-margin; first joint of flagellum somewhat more than one-quarter longer than the second; pronotum with the crest not very pronounced, at the sides obtusely angular; dorsulum punctured like the vertex; episternal suture of mesopleuræ a little sinuous; enclosure of middle segment well marked, the lines or furrows forming it well marked and foveolate, as is likewise the longitudinal furrow dividing the enclosure, this furrow is also broadened basally, two convexities of enclosure very finely and obliquely striated, posterior face apparently finely and transversely rugose; abdomen a little shorter than head and thorax united; pygidium broad, flat, with large, separated punctures. Black; mandibles except apex, and the tarsi yellow; clypeus, antennæ entirely, stripe on pronotum extending to and including the tubercles, tegulæ, scutellum, metanotum (postscutellum) and legs, except tarsi, which are colored as mentioned above, and hind femora and tibiæ, which are somewhat marked with blackish, fulvous; apical margins of abdominal segments broadly, pale testaceous; clypeus, inner orbits, cheeks and thorax on sides beneath, more or less with silvery pubescence; abdomen with a silvery sericeous pile. Length 5.5 mm.

Jacksonville, Florida (Ashmead). Has the facies of *C. impressifrons*. The color markings will distinguish it from the other species of this group.

16. Group *hispidus*.

A single species, differing from those of *ater* group by the broad, non-excavated pygidium, and from those of *minimus* group by the very low triangle which the ocelli form, hairy head and thorax, and the recurrent vein being received by the submarginal cell in its apical third. The ♂ is unknown, but will probably present group characteristics similar to those of the female.

77. **Crabro hispidus** n. sp.

♀.—Clypeus strongly carinated, the anterior margin with the broadly produced portion incurved medially; vertex finely punctured, the front above the depression opaque, and has the appearance of being striato-punctate; frontal depression broad and glabrous; ocelli in a low triangle, but not quite forming a curved line, space between hind pair somewhat less than that between them and the nearest eye-margin; first joint of flagellum about one-third longer than the second; pronotum at the sides anteriorly with a blunt tooth; dorsulum with rather coarse, shallow punctures, longitudinally striated apically; mesopleuræ with sparse punctures; middle segment without a basal enclosure, rugose, particularly above, the longitudinal furrow on upper surface not reaching the base and bounded by a strong ridge at either side, lateral ridges of posterior face indistinct, sides of middle segment tolerably smooth; tibiæ strongly spinose; wings fusco-hyaline, iridescent, nervures and stigma black, the recurrent vein received by the submarginal cell between middle and apex; abdomen microscopically punctured, apical segments most distinctly, ventrally almost impunctate; pygidium triangular, rounded apically, coarsely punctured, flat. Black; tarsi and apical margin of ventral abdominal segments testaceous; head, particularly between frontal depression and vertex, and thorax above with coarse, dark fuscous hair, that on under part of thorax and femora, pale; clypeus only with silvery pubescence. Length 9 mm.

Mt. Hood, Oregon. One specimen.

17. Group *insolens*.

Pronotum anteriorly with a strong crest, which terminates laterally in a sharp tooth or projection; abdomen short, ovate, first segment broad; pygidium narrowed to the apex, acute, depressed or excavated apically. The head is almost square above, but this may be but a specific character.

78. **Crabro insolens** n. sp.

♀.—Head broader than the thorax, almost square above, in consequence of its length almost equaling its width, apparently impunctate; ocelli forming a triangle, the space between the hind pair slightly greater than that between them and the nearest eye-margin; frontal depression deep, but no impressed line extending to the fore ocellus; pronotum with a strongly marked, transverse impression on each side, anteriorly with a strong crest, which terminates laterally in an acute tooth or projection, and is highest medially; dorsulum impunctate, without the

usual impressed line on anterior portion; middle segment smooth, without an enclosure; posterior face widely channeled down the middle, the lateral ridges tolerably distinct; abdomen shorter than head and thorax united, ovate; pygidium acute at apex, convex basally, depressed along the sides and on apical portion. Black; mandibles except apex, scape in front, tibiæ and tarsi, yellowish testaceous, the tibiæ darker within; wings hyaline, iridescent, nervures and stigma black; clypeus and lower part of inner orbits, with silvery pubescence. Length about 3 mm.

Colorado (Gillette). Its square head, smooth, subopaque head and thorax and small size will easily distinguish it from the other small, black species of *Crabro*.

18. Group *planipes*.

Fore tarsi of ♂ greatly flattened or distorted, *i. e.*, the first joint twisted; otherwise as in group *ater*. Female unknown.

79. **Crabro planipes** n. sp.

♂.—Anterior margin of clypeus subtruncate, or slightly rounded out in the middle; head finely punctured, the front more distinctly so, and on occiput most closely; space between hind ocelli a little less than that between them and the nearest eye-margin; a strongly marked impressed line extends back from the anterior ocellus; impressed line extending from frontal depression well marked and reaching the fore ocellus; first joint of flagellum a little longer than the second; pronotum rather higher above than in the other species of this group, laterally obtusely angular; dorsulum more strongly punctured than the front; enclosure of middle segment well marked, basally with numerous, distinct, longitudinal striæ, posterior face rugose toward apex, the lateral ridges strong; fore tarsi flattened, particularly the first joint; abdomen with microscopical punctures, those on the last dorsal segment somewhat more distinct. Black, including the mandibles; scape in front, pronotum, tubercles, scutellum, fore femora, except a narrow dark line behind, medial femora in front, fore tibiæ except a line behind, the medial and hind tibiæ except the apical two-thirds of posterior surface, fore tarsi except a dark spot on first joint at apex and last two joints, medial tarsi almost entirely, and basal half of first joint of hind tarsi, yellow; clypeus, inner orbits and cheeks and sides of thorax more sparsely with silvery pubescence; thorax beneath with longer, pale pubescence. Length 4 mm.

Colorado. Agrees tolerably well with the description of *C. Harrisii* Packard, but is evidently distinct.

80. **Crabro tarsalis** n. sp.

♂.—Clypeus distinctly carinated, its fore margin with the medial produced portion somewhat angular at apex; vertex with fine punctures, those on the front a little more distinct; space between hind ocelli much less than that between them and nearest eye-margin; impressed line extending from frontal depression to fore ocellus feebler than usual, becoming obsolete just before the anterior ocellus; first joint of flagellum longer than the second; the transverse apical impressed line of pronotum is evident at the sides only, and before it, in about the middle of pronotum is a short and stronger, impression, which gives the pro-

notum a subangular appearance at the sides anteriorly; dorsulum more strongly punctured than the front; enclosure of middle segment strongly marked, the medial impressed line broadened basally, within the enclosure smooth except the foveolated base, between it and sides of middle segment rugose, posterior face rugose toward apex, lateral ridges tolerably distinct and bordered outwardly by a strong furrow; first joint of anterior tarsi greatly flattened, twisted, bent in the middle; wings subhyaline, iridescent, nervures and stigma brownish, recurrent vein received by the submarginal cell beyond the middle; abdomen microscopically punctured, the apical segments most distinctly. Black; fore and medial femora yellowish testaceous, darker above and toward apex, their tibiæ and tarsi yellow, the former with a dark testaceous stripe on outer side, trochanters yellowish, hind tibiæ at base and their tarsi basally, pale yellow; apical margins of abdominal segments narrowly and obscurely testaceous; clypeus, front, cheeks with dense silvery pubescence, which is also present on vertex and thorax in a lesser degree, the thorax beneath and fore femora with long, pale pubescence. Length 6 mm.

New York. One specimen. Easily distinguished by the entirely black thorax, shape of first joint of fore tarsi and pale pubescence on fore femora.

19. Group *ater*.

Oloecrabro Thomson, is apparently represented in America by the species of this group. The first abdominal segment inclines slightly to subpetiolate, being longer and narrower than the second; the pygidial area is triangular, narrowed and strongly excavated apically; ocelli in an equilateral triangle; recurrent nervure generally received by the marginal cell a little beyond the middle, although sometimes received more toward the base; pronotum rounded laterally. The males appear difficult to separate from those of the *minimus* group, but the pronotum in that group is crested, and the last segment of abdomen is more strongly punctured than the preceding one, while in this group the last two segments are punctured about the same.

81. **Crabro impressifrons** Sm.

Crabro tibialis Say (nec Fabr.), Long's Second Exp., Appendix, p. 340.
Crabro impressifrons Smith, Cat. Hym. Brit. Mus., iv. 417.
Blepharipus impressifrons Packard, l. c., vi, p. 374, ♀.
Blepharipus scutellatus Packard (non Say), ibid. p. 375, ♂.

♀.—Clypeus distinctly carinated, the anterior margin with the medial produced portion truncate; head very finely punctured, the front most strongly; space between the hind ocelli somewhat less than that between them and the nearest eye-margin, all three forming a tolerably low triangle; frontal depression deep, glabrous, the impressed line extending to fore ocellus also deep; first joint of flagellum scarcely one-quarter longer than the second; dorsulum more distinctly punctured than the vertex; pronotum apparently impunctate, not trans-

versely impressed before apical margin; middle segment polished, glabrous, the enclosure distinct, but the impressed lines forming it become obscure toward base and are not foveolate, the medial furrow perceptibly widened basally, lateral ridges on posterior face distinct, the outer furrow absent: legs rather stout, the medial and hind tibiæ strongly spinose; wings subhyaline, iridescent, with a faint fuscous cloud in the marginal cell, the recurrent vein received by the submarginal cell a little beyond the middle; dorsal abdominal segments 3–5 indistinctly punctured, beneath the abdomen impunctate; pygidium as usual in the species of this group. Black; scape, except a line behind, pronotum, scutellum, apex of fore and medial femora, tibiæ and base of tarsi, bright yellow, the tarsi toward apex somewhat testaceous; tips of mandibles and tegulæ reddish testaceous, the apex of the abdominal segments broadly testaceous; clypeus, inner orbits, cheeks, and sides of thorax with silvery pubescence. Length 6–7 mm.

♂.—Anterior margin of clypeus with a small medial production, which is truncate; head more distinctly punctured than in the female, the space between hind ocelli much less than that between them and the nearest eye-margin; first joint of flagellum longer than the second; pronotum before apex with a transverse impressed line, which is strongest toward the sides; apical margin of the abdominal segments broadly smooth, obscurely testaceous; fore and medial femora reddish testaceous, with a dark line above, their apices yellow; hind tibiæ with a dark spot near apex; head and thorax above with distinct, pale fuscous pubescence. Length 5 mm.

Massachusetts; New York; Illinois (Algonquin, Nason). The species described by Packard as *Bleph. scutellatus* Say, I consider the ♂ of this species. It is doubtful if this is Say's species, as it differs somewhat from the description, and if it were it would necessarily have to fall, being the ♂ of *impressifrons*.

82. **Crabro Harringtonii** n. sp.

♀.—Very close to *nigricornis*, but much smaller; head indistinctly punctured, including the front and vertex, glabrous; pronotum at the sides rounded, without a prominence; dorsulum rather indistinctly punctured, but more distinctly so than the head; middle segment with the enclosure not well marked, but more distinct than in *nigricornis*, posterior face rugose apically, the medial furrow much broadened above and pointed beneath, while in *nigricornis* this furrow is long and fusiform, lateral ridge distinct and with a strong, outer, lateral furrow, which is foveolate. Black, including the scape; tips of mandibles and pygidium at tip, reddish; fore tibiæ in front, medial and fore tarsi, bases of hind tibiæ and tarsi obscurely, yellowish testaceous. Length 4.5 mm.

Ottawa, Canada (Harrington).

83. **Crabro nigricornis** Prov.

Blepharipus nigricornis Prov., Add. Hym. Quebec, p. 294, ♂.

♀.—Clypeus feebly carinated, its anterior margin in the middle crenulated; head finely punctured, the front much more strongly so; space between the hind ocelli a little less than that between them and the nearest eye-margin; frontal depression broad and polished, but not deep the line extending to the fore ocellus distinct as usual; first joint of flagellum fully one-quarter longer than the second;

dorsulum more distinctly punctured than the vertex, but less so than the front; pronotum at the sides with a small, blunt prominence, which, however, does not alter its appearance to any extent; middle segment with scarcely any trace of an enclosure, the medial impressed line, however, distinct, lateral ridges of posterior face short and becoming obsolete above and their lateral furrow absent; abdomen as usual in the members of this group. Black; scape in front and base of hind tibiæ, yellow; clypeus, cheeks and sides of thorax with silvery pubescence; legs with a silvery sericeous pile; wings subhyaline, iridescent, a slightly darker cloud in the marginal and submarginal cells, nervures and stigma black, recurrent vein received by the submarginal cell beyond the middle. Length 7.5–8 mm.

♂.—Medial production of clypeus smaller than in *impressifrons;* frontal depression deep; space between hind ocelli distinctly less than that between them and the nearest eye-margin; first joint of flagellum longer than the second; pronotum with a transverse impressed line before its apical margin; fore and medial legs pale testaceous, their femora with a darker stripe, hind tibiæ yellow at base, testaceous beyond on inner side; head and thorax above with pale pubescence. Length 5.5–6 mm.

Canada (Harrington); Montana; Virginia. The western specimens are the smallest, but otherwise agree with the eastern specimens. In the original description of this species the antennæ are said to be entirely black, but in a series of seven specimens but one has not the scape marked with yellowish.

84. **Crabro nigror** n. sp.

♀. Clypeus distinctly carinated, its fore margin in the middle rounded out; head with fine, distinct, punctures, somewhat stronger on front; space between hind ocelli about equal to that between them and the nearest eye-margin; frontal depression and impressed line as in the preceding species; first joint of flagellum scarcely one-quarter longer than the second; pronotum with a transverse impression or furrow before its hind margin, its punctuation, as well as that of the dorsulum, a little more distinct than that of the vertex; lines forming the enclosure of middle segment wide and deep, narrower, however, than those in *cinctipes*, the smooth areas, therefore, larger and more distinct, bordering the enclosure laterally, is a tolerably smooth space, which narrows toward base of metathorax, and is bounded outwardly by a strong, coarsely sculptured furrow, which extends down to the apex of middle segment just outside the lateral ridges of the posterior face, the latter with some transverse rugæ apically; middle and hind tibiæ tolerably well armed with spines; wings subhyaline, strongly iridescent, nervures and stigma brownish; first two dorsal segments of abdomen impunctate, the remainder microscopically punctured; pygidium as usual. Black; mandibles at apex, tegulæ and apex of abdomen, reddish testaceous; tarsi testaceous; clypeus with dense silvery pubescence, that on the cheeks and thorax on sides and beneath, sparse; legs with silvery sericeous pile. Length 5 mm.

New Hampshire. One specimen. The absence of transverse impressed line on pronotum, greater space between hind ocelli, clearer

wings and sculpture of metathorax will separate this species from *ater*.

85. **Crabro cinctipes** Prov.

Blepharipus cinctipes Provancher, Faun. Ent. Can. ii, 667, ♂.

♀.—Clypeus well carinated, the produced medial portion subtruncate; head with tolerably fine, distinct, punctures, finer on cheeks and stronger on front; ocelli forming a lower triangle than in *ater*, the space between the hind pair but little, if anything, less than that between them and the nearest eye-margin, the depressions in which the ocelli are situated not so well marked as in *ater*; frontal depression and impressed line as in that species; antennæ somewhat shorter, the first joint of flagellum not quite one-quarter longer than the second; pronotum smaller than in *ater*, and with the dorsulum somewhat more strongly punctured than the vertex; mesopleuræ with punctuation about similar to that of the vertex; lines forming the enclosure and the longitudinal furrow of middle segment wide and deep, the enclosed smooth areas consequently small; bounding the enclosure laterally is a narrow, smooth space, between which and the sides there is a depression or furrow, which is rugose, the posterior face with coarse, transverse rugæ, and outside of the lateral ridges a strongly foveolate furrow runs; wings subhyaline, iridescent, the apical half darkest, nervures and stigma black; first two dorsal segments glabrous, impunctate, the remaining microscopically punctured, the fifth most strongly, pygidium convex basally, excavated toward apex. Black; mandibles at apex, tegulæ and apex of abdomen, reddish testaceous; tarsi testaceous; base of hind tibiæ, obscurely, yellow; clypeus with dense, silvery pubescence, that on the cheeks and thorax, on sides and beneath, sparse, legs with a silvery sericeous pile. Length 7 mm.

♂.—Clypeus distinctly carinated, its anterior margin armed with three strong prominences, the middle one of which is largest; space between hind ocelli a little less than that between them and the nearest eye-margin; punctuation of dorsulum and scutellum feebler than in the ♀; middle segment about as in the ♀, except that the smooth areas within the enclosure are smaller and indistinct; joints 2–4 of anterior tarsi, 1–3 of medial tarsi, basal half of joints 2–4 of hind tarsi and their tibiæ at base, obscurely, yellowish. Length 6.5 mm.

Canada (Harrington). The greater space between hind ocelli, sculpture of metathorax, form of clypeus and color of legs in ♂ will distinguish this species from *C. ater* and *nigror*.

86. **Crabro ater** Cress.

Crabro ater Cresson, Proc. Ent. Soc. Phila., iv, p. 477, ♀.

Blepharipus ater Packard, ibid. vi, p. 374, ♀.

♀.—Clypeus distinctly carinated, its fore margin rounded out medially; head with distinct, tolerably fine punctures, finer on cheeks and stronger on front; ocelli in an equilateral triangle, situated in strong depressions, the space between the hind pair distinctly less than that between them and the nearest eye-margin; frontal depression wide and distinct, glabrous, the line extending to the fore ocellus strong; first joint of flagellum about one-quarter longer than the second; pronotum convex above, impressed medially, rounded laterally, transversely depressed before apical margin, and like the greater part of the thorax is punctured similarly to the vertex; mesopleuræ more finely and sparsely punctured; middle

segment with the enclosure strongly marked, the impressed lines enclosing it foveolate, as well as its base, where there are sometimes a few short, longitudinal striæ, the medial furrow deep and extending the entire length of the metathorax, the posterior face with some tolerably coarse, transverse rugæ apically; middle and hind tibiæ with short, stout spines; wings fusco-hyaline, paler basally, iridescent, nervures and stigma black; abdomen glabrous, microscopically punctured, above on the fifth segment more strongly, beneath impunctate; pygidium with strong, separated punctures, convex at base, excavated apically. Black; tips of mandibles, tegulæ and apex of abdomen sometimes reddish testaceous; clypens with dense, silvery pubescence, that on cheeks, thorax on sides and beneath, sparser; legs entirely black, with a silvery sericeous pile. Length 7.5–8 mm.

♂.—Clypeus strongly carinated, its fore margin rounded out medially; head a little more finely punctured than in the ♀; impressed lines on metathorax above stronger, the posterior face with the apical rugæ stronger, as are likewise the lateral ridges, and just outside of these is a strong furrow within a short distance of the metathoracic stigmæ (this is less distinct in some specimens than in others); abdomen microscopically punctured above and beneath, the last two dorsal segments most strongly. Length 6.5–7 mm.

Colorado; Washington; Mt. Hood, Oregon; Brunswick, Maine (Packard); New Hampshire. The specimen with yellow scape and base of hind tibiæ, recorded from West Virginia, by Packard, is evidently another species, and very likely *C. nigricornis*.

20. Group *abdominalis*.

In this group the abdomen is petiolate, but the first segment is scarcely nodose at the apex; pygidium broad, not depressed; the head is greatly produced behind the eyes; the ocelli forming a low triangle, the hind pair being widely separated; sculpture of head and thorax coarse, mesopleuræ ridged anteriorly. In this latter character the group shows its relationship to the preceding groups, all of which exhibit it in a more or less developed state. In the last two groups, *occidentalis* and *pedicellatus*, this character is wanting.

87. **Crabro abdominalis** n. sp.

♀.—Clypens very short, flat; just behind it, between the antennæ, there is a short, stout projection; mandibles large, at the apex armed with two very strong, diverging teeth, which are extremely large for the size of the species; head covered with coarse, rather close punctures, finer on the cheeks; ocelli in a low triangle, the space between the hind pair decidedly greater than that between them and the nearest eye-margin; at the side of each hind ocellus is a wide impression, which extends back some distance; frontal depression deep, the line extending to the fore ocellus strongly marked; first joint of flagellum about one-third longer than the second, and is also much longer than the pedicellum, which is a little longer than the second joint of flagellum; the cheeks are cut off obliquely beneath; pronotum sharply angulate at the sides, with a strong impression in the middle; thorax coarsely punctured, but more closely so than the head; middle

segment at base with an enclosure which is strongly depressed or excavated, with its surface rugose, and is pointed posteriorly in the middle, and is apparently connected with a deep, elongate-ovate fovea on posterior face, which is indistinctly ridged laterally, and above the fovea is strongly and longitudinally striated; legs slenderer than in any of the following species, the femora thickened basally as usual and not medially as in *pedicellatus, rufigaster* and *occidentalis;* hind tibiæ strongly serrated and spinose; first abdominal segment much longer than the second, not nodose at apex; pygidium large, triangular, strongly punctured, not depressed; wings hyaline, nervures and stigma whitish, the recurrent vein received by the submarginal cell much before the middle. Head and thorax black; abdomen except first segment and the second in part, reddish; mandibles, except base and apex, which are rufo-testaceous, scape at base and apex, tips of fore femora, base of medial and hind tibiæ, and the fore tibiæ, except a dark stripe within, the anterior tarsi entirely, and the basal joint of the remaining tarsi, pale yellow; clypeus and thorax beneath with silvery pubescence. Length 5 mm.

Texas. One specimen.

88. **Crabro asperatus** n. sp.

♂.—Anterior margin of clypeus sinuous, the projection just behind it distinct; mandibles not very large, much less developed than in *abdominalis;* head with exceedingly coarse, scattered punctures, which become finer on the front, the cheeks finely and closely punctured; ocelli in a low triangle, the space between hind pair decidedly greater than the space between them and the nearest eye-margin, all the ocelli situated in strongly marked pits, the vertex lacking the lateral impression on each side of the hind pair; frontal depression deep, the impressed line extending to the fore ocellus wide and deep; first and second joints of flagellum about equal in length, the terminal joints somewhat broadened and obliquely truncate at apex; cheeks a little rounded out beneath; the head, although considerably produced behind the eyes is not so much so as in *abdominalis;* pronotum at the sides obtusely angular, impressed medially; thorax coarsely punctured, more closely so than the head, the sculpture of sides and beneath finer; middle segment as in *abdominalis*, but the sculpture not as distinct; medial and hind tibiæ tolerably spinose, the hind pair slightly serrate; first segment of abdomen about one-third longer than the second, the abdomen, in form, clavate, and much longer than head and thorax united; wings hyaline, nervures pale testaceous. Black; mandibles except base and apex, tips of femora, the base of the medial and hind tibiæ, the fore tibiæ, except dark line within, their tarsi entirely and two basal joints of remaining tibiæ, pale yellow; tegulæ testaceous clypeus, front, cheeks and thorax on sides and beneath, with dense silvery pubescence. Length 4 mm.

Las Cruces, New Mexico (Cockerell), August. Two specimens. One specimen exhibits a decided metallic bluish tinge on the thorax.

21. Group *decorus.*

Similar to group *occidentalis*, but the episternum mesopleuralis ridged anteriorly; petiole of abdomen short, stout, but little longer than the following segment; pronotum not dentate; pygidium (♀) broad, flat, not excavated; legs not robust, as in the next two groups. Male unknown.

89. **Crabro decorus** n. sp.

♀.—Clypeus subcarinated, slightly and obtusely produced medially; head finely and evenly punctured, shining; ocelli in a high triangle; no lateral impressions on the vertex; frontal depression shining, the impressed line running from it to the fore ocellus distinct; first joint of flagellum longer than the second, the pedicellum not unusually large; dorsulum more closely punctured than the head, subopaque; mesopleuræ more strongly and less closely punctured; middle segment with a distinct enclosure above, the furrows foveolate, particularly the basal one, upper surface smooth, posterior face transversely striated, with distinct lateral ridges; legs rather slender, the hind tibiæ spinose, but scarcely serrate; abdominal petiole short, stout, nodose apically, but little longer than the following segment; pygidium broad, acute at apex, strongly punctured, at apex a little depressed, but not excavated. Black; mandibles except tips, scape, pronotum, tubercles, scutellum anteriorly, coxæ apically, trochanters, four anterior femora except a dark spot at base above, fore tibiæ entirely and the others except a line on the medial internally and inner portion of hind pair, the four anterior tarsi and the basal joints of hind pair, yellow; this color encircles the hind tibiæ at base; clypeus and thorax on sides and beneath with silvery pubescence; abdomen with a sericeous pile; wings hyaline, strongly iridescent; nervures and stigma black. Length 4.5 mm.

Las Cruces, New Mexico (Cockerell), in October.

22. Group *occidentalis*.

Differs from all the preceding by the non-ridged episternum mesopleuralis; pygidium (♀) broad, depressed apically; petiole of abdomen shorter than the following segment; legs robust.

90. **Crabro occidentalis** n. sp.

♀.—Clypeus slightly convex, depressed laterally, its anterior margin in the middle with a broad, truncate production; head finely, but distinctly punctured; ocelli in a triangle, the depressions on the vertex distinct, and in addition there is an impressed line which extends back to the occiput; frontal depression glabrous, broad, the impressed line which extends upward from it deepest just before the anterior ocellus; second joint of flagellum about one-quarter longer than the first, which joint is about a third shorter than the pedicellum; thorax punctured like the head; middle segment without a basal semicircular enclosure, but at extreme base there is a transverse row of strong foveæ, the upper surface is parted by a medial, longitudinal, strongly impressed line, which terminates in a deep pit at the base of posterior face, the sides of this pit each with a strong ridge, these two ridges meet at the apex of the pit and extend to apex of middle segment in the shape of a Y, the posterior face of middle segment is strongly ridged laterally, and is another ridge connecting the lateral with the medial ridges at the top of the posterior face, the surface of which is marked with some coarse folds; legs robust, the medial and hind tibiæ with not very strong spines, the hind tibiæ but feebly serrated without; first abdominal segment shorter than the second, nodose at apex, with two well-developed, parallelo-longitudinal ridges basally, which are as long as one-third the length of the segment; pygidium broad, subtriangular, obtuse at apex, depressed at the sides and apex; wings subhyaline, iridescent,

nervures and stigma brownish. Black; mandibles, and legs sometimes, rufotestaceous; extreme base and apex of scape and first two joints of medial and fore tarsi, pale yellow; tegulæ pale testaceous; clypeus, inner orbits beneath and cheeks with silvery pubescence; thorax on sides and beneath and legs with silvery sericeous pile, which is more obvious in certain lights. Length 8 mm.

♂.—Clypeus less distinctly produced medially, antennæ simple: first joint of medial tarsi simple; abdomen, scape in front, apex of medial and the fore tibiæ anteriorly, and their tarsi entirely, pale yellow. Length about 7 mm.

Nevada. Four specimens labeled *Rhopalum occidentale* Cress., evidently a manuscript name only. Its larger size will distinguish it from the species of the preceding or the following group.

23. Group *pedicellatus*.

The two species composing this group are distinguished from the three preceding groups as follows: pygidium (♀) narrow, excavated its entire length; anterior margin of clypeus angularly produced. This is the only group having a petiolated abdomen, in which the ♂ antennæ are dentate or lobate beneath.

91. **Crabro pedicellatus** Pack.

Rhopalum pedicellatum Packard, Proc. Ent. Soc. Phila., vi, p. 380, ♂ ♀.

♀.—Clypeus subconvex, with anterior margin acutely and angularly produced in the middle, and on each side with a small tooth; head finely and evenly punctured; ocelli in a triangle, a depression on the vertex on each side of the posterior pair, which extends to the inner orbits; frontal depression broad and polished, a narrow impressed line extending from it to the fore ocellus; second joint of flagellum nearly three times longer than the first, which is a little more than half as long as the pedicellum; thorax punctured about like the head; enclosure at base of middle segment semicircular and distinct, and divided by a longitudinal, strongly impressed line, which extends down on the posterior face in the form of a deep and wide furrow, the sides of the posterior face ridged; legs robust, particularly the hind pair, the four hind tibiæ strongly spinose, and the posterior pair strongly serrated in addition; first segment of abdomen above grooved on basal half, the posterior portion enlarged and glabrous, in length somewhat longer than the second segment; pygidium strongly concave or excavated; wings hyaline, strongly iridescent, nervures and stigma black. Black; scape, tubercles, all the coxæ and trochanters, the apical portion of femora, except hind pair, the fore tibiæ entirely, the four hind tibiæ at base and the fore and medial tarsi, pale yellow; mandibles yellowish testaceous; flagellum dark fuscous, paler beneath; tegulæ and pygidium testaceous; clypeus, inner orbits below, cheeks and thorax beneath less densely, with silvery pubescence. Length 5–6 mm.

♂.—Clypeus large and broad, the lateral portions of the anterior margins slightly revolute, the produced medial portion obtuse at apex; antennæ 13-jointed; second joint of flagellum twice as long as the third, narrowed basally, and developed into a lobe on apical portion beneath; third joint as long or longer than the following two united, also much narrowed basally; basal joint of medial tarsi laminate within; hind tarsi somewhat flattened, the basal joint curved, and much broadened apically; abdomen longer and narrower than in the ♀; hind femora testaceous at apex, not serrate or strongly spinose; otherwise like the ♀.

Maine; Massachusetts; New York; Connecticut (Packard); Algonquin, Illinois (Nason); Ingham County, Michigan (Davis); New Jersey; District of Columbia (Ashmead). The ♂ antennæ are 13-jointed as far as I can determine, and not 14-jointed as stated by Packard; and a careful search failed to show the four minute teeth on the hind femora mentioned by Packard. That author was probably deceived by particles of dirt which I find on the femora of his type specimen, giving them the appearance of being dentate.

92. **Crabro rufigaster** Pack.

Rhopalum rufigaster Packard, l. c., p. 382, ♂ ♀.

♀.—Clypeus subcarinated, the fore margin but slightly and obtusely produced in the middle and without the small lateral tooth as in *pedicellatus;* head finely and evenly punctured; ocelli in a triangle, the lateral depressions on the vertex faint; frontal depression not so strong or polished as in the preceding species, and the line which extends to the fore ocellus fainter; second joint of flagellum about three times longer than the first, which is not more than half as long as the pedicellum; thorax punctured like the head; middle segment without the basal enclosure, the longitudinal impressed line, however, distinct as in *pedicellatus*, the lateral ridges of posterior face not well developed; legs robust, but less so than in *pedicellatus*, the hind tibiæ serrate and spinose; first abdominal segment as in the preceding species, except that it is slenderer; pygidium not concave, but depressed equally; wings hyaline, iridescent, nervures and stigma black. Black; mandibles and tegulæ yellowish testaceous; scape, pedicellum and first joint of flagellum, tubercles, fore and medial legs entirely, the coxæ, trochanters and base of tibiæ and tarsi of hind legs, pale yellowish; greater part of abdomen beneath, basal half of third and apical portion of fifth and the sixth dorsal segments, reddish (the distribution of red on the abdomen varies); clypeus, inner orbits below, cheeks and thorax on sides and beneath with silvery pubescence. Length 5–7 mm.

♂.—Clypeus much larger and more produced than in the ♀, having the form of that of *pedicellatus*, except that it is not revolute; pedicellum as long or longer than the first and second joints of the flagellum united, third joint of flagellum nearly as long as the preceding two and pedicellum united, is lobate apically and narrowed basally, the second joint is produced into a very long, stout tooth apically, which is in length longer than the joint itself; in addition to the yellow livery of the ♀, the ♂ has the clypeus and mandibles yellowish; basal joint of medial tarsi not laminate within. Length 4.5 mm.

Illinois (Packard); Philadelphia, Pennsylvania (in August); District of Columbia (Ashmead). Easily distinguished by color of legs and abdomen, the absence of enclosure at base of middle segment, and by the peculiar ♂ antennæ.

*Unidentified Species.**

93. **Crabro frigidus** Sm.

Crabro frigidus Smith, Cat. Hym. Brit. Mus. iv, 419, ♀.

"Female. Length 5½ lines.—Black: the head finely punctured, the cheeks sparingly so, smooth and shining; the ocelli in a curve on the vertex; the scape and mandibles yellow, the base and apex of the latter black. Thorax: the mesothorax longitudinally striated; the scutellum shining, punctured at the base, and longitudinally striated beyond; the metathorax with a subdefined half-circular space at its base, which is coarsely striated obliquely; posteriorly it is very coarsely and deeply rugulose; a spot on each side of the collar and the tubercles yellow, the anterior lateral angles of the collar subdentate; the knees, tibiæ and tarsi yellow, the apical joints of the latter fuscous, the extreme apex of the tibiæ with a ferruginous stain; the wings fusco-hyaline. Abdomen smooth and shining, the first segment very delicately punctured, the following segments more distinctly so; the second and three following segments with an ovate, pale yellow macula on each side at their basal margin; the apical segment produced into an obtuse spine, which has a sharp, raised margin, and is covered sparingly with oblong punctures.

"*Hab.*—North America."

May belong to group *singularis*.

94. **Crabro Harrisii** Pack.

Crabro pusillus Harris (nec H.-S.), Cat. Ins. Mass. p. 68 (teste Packard). No description.

Blepharipus Harrisii Packard, Proc. Ent. Soc. Phila., vi, 376, ♂.

"♂. Head as described in *B. impressifrons*, the impressed line in front of the ocelli being present, the front narrow, depressed; ocelli in an equilateral triangle, but the head is shorter and more transverse. Orbits and clypeal region silvery, the latter narrower than in the preceding species [*scutellatus* = ♂ of *impressifrons*], proportionately longer and more strongly carinated than in *B. impressifrons*. Mandibles slender, bidentate, tip deeply grooved beneath the teeth, black, tip rufo-testaceous. Joints of palpi slender, cylindrical, testaceous. Scape of antennæ long and slender, clavate, angular, dark brown above, beneath obscurely yellow, basal joint of the flagellum brown, not black, filiform, slender, and longer than in *B. impressifrons*. Prothorax narrower than in *B. impressifrons*, with a yellow stripe slightly interrupted by a mesial notch. Mesothorax quite smooth, polished, slightly and sparsely punctured, with long hairs arising from them, entirely black. Propodeum with a distinct semi-ovate enclosure, with fine striæ diverging from the mesial furrow, which is narrow but distinct; towards the flanks the striæ become transverse. Wings immaculate, clear, iridescent, costal nervure dark rufous, posterior nervures testaceous, pterostigma dark. Fore femora reddish yellow, stained with brown externally; middle femora dark brown, yellow beneath and at tips; hind femora entirely brown; tibiæ yellow, posterior pair tipped with brown; two anterior pairs of tarsi yellow, posterior ones dark. Abdomen cylindrical, very much rounded above, beneath convex, nearly equaling the head and thorax together in length, longer, narrower and slenderer than in *B. impressifrons*, brown-black, edges of the abdominal segments obscurely pale.

* These are not included in the synoptical tables.

more so than in the species above mentioned. Length of body, .26; head and thorax together, .13; abdomen, 13 inch.

"Differs from the species with which it has been compared in the description given above, in its shorter more transverse head and slenderer body, in its fore femora being entirely yellow above; in the sculpturing of the propodeum, where in *B. impressifrons* it is entirely smooth. The hind tibiæ are much smoother, scarcely spinulated. It will also be readily distinguished by the want of the pale testaceous posterior margin of the abdominal segments.

"Cambridge, Mass. (coll. Harris). 'June and August 15, on flowers.' Harr. MS."

95. **Crabro maculatus** Fabr.

Crabro maculatus Fabricius, Ent. Syst. ii, p. 295.

"C. thorace maculato, abdomine atro: maculis utrinque quatuor flavis, tibiis flavis.

"Habitat in America boreali Mus. Dom. Banks.

"Medius. Antennæ nigræ primo articulo flavo. Caput nigrum labio argenteo. Thorax niger striga antica, puncto sub alis scutelloque flavis. Abdomen atrum, nitidum maculis utrique quatuor transversis, flavis. Femora nigra. Tibiæ flavæ."

96. **Crabro oblongus** Pack.

Crabro oblongus Packard, l. c., p. 88, ♀.

"♀. Closely allied to *C. singularis*, head of much the same proportions, but narrows a little behind and is throughout narrower as the entire body is. Eyes a little nearer together; the convexity of the vertex and the grooving of the front the same as in *C. singularis*. Antennal groove well marked, polished, on each side a narrow edging of silken pubescence; clypeus golden as in *C. singularis*, but the hairs are much finer, the lateral lobes are more triangular and silvery; mandibles black, with the middle wedge-shaped area twice grooved towards the base, where in *C. singularis* it is smooth; palpi slender, joints much longer and slenderer by one-third than in the other species above named. Antennæ as in *C. singularis*, scape entirely yellow, hardly as stout, joints of flagellum a little stouter. Two square, yellow spots on the prothorax; lateral tubercle yellow; mesothorax entirely black above with no yellow markings; surface of the scutum finely striated; scutellum and meta-scutellum highly polished. Propodeum much as in *C. singularis*, but the mesial furrow widens at the base, with similar lateral and transverse rugæ; legs colored much the same; within the hind tibiæ a dark stripe. Abdomen long, sides unusually parallel, giving it an oblong slope [shape?]; with ten yellow fasciæ, those on the basal joint being simply dots, those on the second ring much larger than the succeeding ones, not wedge shaped, but elliptical; beneath very convex; tip one-half as long as in *C. singularis*, the enclosed triangular upper surface much longer and narrower than in the allied species. Length of body, .64; head and thorax, .33; abdomen, .31 inch.

"Conn. (Norton).

"Differs from *C. singularis* in its much narrower and slender body,

narrower head, larger palpi, with the mandibles grooved towards insertion in the middle area; in the wholly black meso-thorax, except the yellow tubercle, and in the abdomen having an additional pair of fasciæ. The tip of the abdomen is scarcely one-half as large, of different proportions, being longer and narrower than in *C. singularis*, while the abdomen is much flattened above, where in *C. singularis* it is much more convex."

97. **Crabro septentrionalis** Pack.

Crabro septentrionalis Packard, l. c., p. 110, ♀.

"♀. Head short, broad, transversely oblong, being one-half as long as broad, body long and flattened, finely punctured, vertex flattened, slightly depressed; ocelli arranged in a low triangle, which is nearly equilateral; eyes wide apart as usual; surface concave in front of the ocelli; antennal groove well marked; orbits on each side lined with a broad track of golden pubescence like the clypeal region; clypeus as long as broad, acutely produced on the front edge, but truncate at tip, strongly carinated, black; mandibles as usual bidentate, yellow, black at tip. Antennæ of the usual proportion, scape a little compressed and angulated longitudinally, slightly dilated in the middle, entirely yellow; flagellum black, basal joint yellowish beneath, abdomen ferruginous. Prothorax with two narrow, yellow stripes, rather remote, one on each side. Thorax broad, somewhat flattened above; on mesoscutum are two distinct submesial ridges and parapsidal grooves; surface finely and closely punctured; a slight yellow spot, sometimes absent, on the middle of the meta-scutellum. Tubercle on the flanks as usual. Enclosure on propodeum distinctly marked, semi-elliptical, mesial furrow with slightly ridged sides, on each side diverging rugæ of unequal length, posteriorly the lines more transverse and finer, with a few scattered gray hairs. Tegulæ ferruginous, nervures dull ferruginous. Fore femora black, tibiæ yellow, ferruginous within, tarsi yellow, shaded on the sides with pale ferruginous, middle femora black, yellow at tip beneath, tibiæ yellow, with a large oval black spot within, hind pair tuberculated and unusually spinulated; tarsi yellowish, ungues ferruginous; hind femora black, lined within with a silvery pubescence forming a regular line of long, silvery, evenly-cut hairs; basal joint of tarsi yellow, ferruginous at tip, remaining joints wholly reddish. Abdomen broad and flattened, convex beneath, a little longer than the head and thorax together, with five pairs of fasciæ, those on basal segment reduced to single square dots; those on second segment are broader than the others, third pair longer, narrower and nearly contiguous on the mesial line of the body; those on the fifth rings unite to form a continuous band, more ovate and broader than the others. Beneath black, edges of segments obscurely testaceous. Length of body, .54; head and thorax together, .26; abdomen, .28 inch.

"Hudson Bay Territory (coll. Norton); Maine, Brunswick, and head waters of Penobscot (Packard)."

This evidently belongs to group *nigrifrons*, and is not unlikely identical with that species.

98. **Crabro unicus** Patt.

Blepharipus unicus Patton, Can. Entom. xi, p. 214, ♀.

"♀. Length 5 mm. Black, tips of the mandibles, tegulæ, spurs of posterior tibiæ and extreme base of the first joint of posterior tarsi, the last joint of posterior tarsi, the tips of all the coxæ and trochanters and the tips of the posterior femora and tibiæ, fuscous. Scape beneath, dot on first joint of flagellum, the tubercles, the four anterior tibiæ excepting a black spot beneath, and the tips of the four anterior femora, yellow. The four anterior tarsi, excepting the fulvous apical joint, and the base of the posterior tibiæ, whitish. Clypeus black, covered with a silvery pile; flagellum fulvous beneath. Thorax beneath and the abdomen with short scattered pubescence. The abdomen excepting the rufo-piceous enclosure on the sixth segment entirely black. Wings hyaline, beautifully iridescent, the nervures and stigma black. Head, thorax and abdomen smooth. The head as wide as the thorax, and the vertex *longer than wide*, the front narrow. The ocelli arranged in an equilateral triangle, each in a separate depression; from the anterior ocellus an impressed line extends downwards upon the face and another extends backwards on the vertex; on the inner orbit on the vertex is a slight groove curving at the end to come in a line with a short oblique groove behind each posterior ocellus. Prothorax sharply angulated beneath, mesopleuræ sharply angulated beneath near the coxæ. Anterior portion of the mesonotum with four short lines which extend upon the collar as slight notches; mesonotum with a slight groove on each side of the disk and with a marginal row of reticulations over the tegulæ. Scutellum quadrate, connected with the mesonotum by the broad lateral angles between which it is separated by a basal row of large reticulations. The semi-circular area on base of metathorax is encircled by a row of similar reticulations and divided by a deep median groove. Similar rows of reticulations extend in a slightly curved line down upon the mesopleura from the anterior wings and others mark the lateral sutures of the metathorax. The sides of the mesothorax beneath and the sides and posterior face of the metathorax are finely striate; these striæ curve upon the metathorax above, and are represented within the enclosure by striæ of microscopic fineness. The posterior face of the metathorax has a deep triangular median depression above, and is more coarsely rugose beneath. Area on the sixth segment of abdomen not punctured, depressed medially, the sides much thickened and raised. Abdomen shorter than the rest of the body, narrow at base, broad near the tip. The posterior tibiæ much thickened.

"New Haven, Conn., July 15th.

"The elongate head and clavate abdomen give this species a very peculiar appearance."

Belongs evidently to either group *ater* or *insolens*, or near by.

99. **Crabro niger** Prov.

Crabro niger Provancher, Add. Hym. Quebec, p. 419, ♀.

"♀. Length .26 inch. Black in all its parts, without a spot, polished, shining. Head transverse, not narrowed behind the eyes. Thorax finely punctured, the metathorax strongly rugose, with irregular striæ basally. Wings hyaline, nervures brown, stigma black. Tegulæ pitchy-black. Legs not maculated. Abdomen subpedunculate, polished, shining, smooth, its apical projection [pygidium] channeled. Ottawa (Guignard)."

Belongs very likely to group *ater*.

100. **Crabro columbianus** Kohl.

Crabro (Lindenius) columbianus Kohl, Ann. k. k. Naturh. Hofm. Wien, vii, 203.

"Black, head a little bronzed. Mandibles, scape of antennæ, interrupted line on collar, humeral tubercle, spot on tubercles and greater part of legs, yellow. Punctuation of head and thorax much denser than in *Cr. pygmæus* R., and *Cr. algira* and frontal line deeper. Foveolated suture of episternum mesopleuralis feebler than in *Cr. pygmæus*. Cordiform area of middle segment large, shining, divided into two parts by a longitudinally narrow median line, crenate at base, on sides and posteriorly not divided by a crenulated fossa. Length 5 mm. ♀."

"To my knowledge no *Crabro* of the group *Lindenius* has been described from the nearctic region; neither could I refer none from the described black bodied species of *Crabro* to the group *Lindenius*, so it almost seemed, as though this group were not represented in America. At the present time, however, a female specimen of a species from British Columbia (Revelstoke) lies before me. It resembles very much a small specimen of *L. pygmæus* from the Mediterranean region in respect to size and coloration, and indeed that variation, in which, besides the yellow humeral tubercles, there is also a narrow interrupted band on the collar in the middle, and a spot upon the scutellum of the same color. The color of the legs is as in *pygmæus*, namely the tips of the knees citron-yellow, the entire anterior part of the fore and middle tibiæ, the basal half of hind tibiæ and the metatarsus of all pairs. The remaining tarsal joints brown. Flagellum beneath rust-color. The black of the head shows that brassy lustre of the *Lindenius* group, but only to a slight degree. From *pygmæus*, *columbianus* is distinguished principally by the deeper frontal line, by the much closer, though fully as fine, punctuation of the head and thorax—in *pygmæus* these parts are somewhat sparsely, punctured—further by the more subtile foveæ of the episternal furrow of the mesopleuræ. The cordiform area is large and smooth, parted longitudinally by a fine medial line, on the base furnished with longitudinal wrinkles, which, contiguous to the postscutellum, show a transverse series of irregular foveæ. From the posterior part of middle segment and from its sides—at all events in distinction from *pygmæus*—the boundary of the cordiform area is not very sharply defined, about as in *Cr. (L.) algira* Kohl. Pygidium punctured, apically rust-red."

101. **Crabro rugosopunctatus** Prov.

Thyreopus rugosopunctatus Provancher, Hym. Quebec, p. 664, ♀.

Crabro rugosopunctatus Kohl, Zool. Jahrb., Abth. f. Syst. iii.

"♀.—Length .30 inch. Black, strongly punctured; the tubercles yellow,

ocellated by a black spot, a line on the postscutellum, the tibiæ beneath, with five pairs of spots on the abdomen, yellow. The clypeus entirely black with silvery pubescence, the mandibles and the prothorax without spots. The mesothorax with deep punctures, but little dense, the metathorax strongly rugose, alveolate. Wings tolerably enfumed hyaline at the base, their tegulæ brownish red. Legs black, the tibiæ yellow beneath, the tarsi brownish ferruginous. Abdomen ovate, strongly punctured, contracted at the sutures, the five basal segments with a yellow spot on each side near the base, these spots broad, truncate (coupées carrées) at the sides of the abdomen, pointed internally, but all strongly separated, not approaching on the back; the fifth segment has also two yellow spots in the middle between the two spots. Anal plate short, tolerably convex, with large punctures, its borders carinated.

"We received this new species from Mr. Brodie, who sent it from Toronto; it is very distinct from all the others by its form and punctuation."

This cannot belong to groups *tenuiglossus* or *largior* (= *Thycreopus*) as it is too coarsely sculptured.

102. **Crabro elongatus** Prov.

Thycreopus elongatus Provancher, Add. Hym. Quebec, p. 293. ♂.

"♂.—Length .45 inch. Black, opaque, finely punctured. Head transversely quadrate, very short behind the eyes and abruptly narrowed with whitish hair on the vertex; the clypeus, mandibles except apex, the scape of the antennæ, white or pale yellow. Scape of antennæ strongly dilated at apex, white with a black band above, sinuated interiorly almost to the apex, the flagellum entirely black, fusiform, the joint short to the middle, broad, flattened beneath, diminishing gradually toward the apex. Thorax not maculated; metathorax rugose, with irregular striæ. Wings slightly and uniformly obscured. Anterior legs with the trochanters white, black at the base and having a spine at apex, the femora dilated, white, black at apex, the tibiæ white in front, armed with a large leaf-like appendage in the form of a shield, the posterior border sinuated and terminating in a sharp point black at the base, whitish toward the apex with three longitudinal brown bands, the base of outer side has three transverse, fine, white lines. Four posterior legs pale yellow, their femora with a black line above and beneath; the posteriors with their tarsi yellow, brownish at apex. Abdomen elongate, polished, brilliant, black with a pale yellow band on each segment, on the basal segment this band is interrupted and sinuated on each side, broader on the second and interrupted the same as on the third; the terminal segment rounded, with a long, white spine on each side and another one between them; the band on the second segment is inclined forward on the sides, and there is placed in the angle at apex a small triangular spot quite near the margin; the third segment has beneath a spot at each side of its apex.—Cap Rouge.

"Female still unknown. This species is easily recognized by its coloration."

Evidently closely related to *C. pallidus* mihi.

103. **Crabro signifer** Pack.

Thyreopus signifer Packard, Proc. Ent. Soc. Phila. vi, p. 361, ♂ ♀.

Crabro signifer Kohl, l. c. p. 585.

"♂. Head more cuboidal than in *T. cribrellifer*, being longer and not narrowing so rapidly behind; the front less deeply excavated, eyes of same size, ocelli arranged in a similar low triangle; in front of them a transverse line of hairs extending towards the insertion of the antennæ. Clypeus as in *T. latipes*, a lateral line of silvery hairs along the front edge of the eyes as usual. Antennæ simple, joints cylindrical, long and slender, sutures well marked, second joint a third longer than the first or third; joints showing a slight tendency to become flattened beneath; black scape yellow, black at base on upper side; mandibles black, a little yellowish at base. Prothorax above reddish yellow, interrupted in middle; thorax much as in *T. cribrellifer*; a reddish yellow stripe on scutellum; hind edge of yellow tubercle very convex. Fore coxæ, femora and trochanters black, tibiæ expanded into a broad concavo-convex, shield-like plate, as long as broad, subpentagonal, the angles much rounded, and the end obtuse, being angulated near the middle of the posterior edge, and near the base of the anterior edge; tibiæ yellow, but the plate dark, with light lines radiating from the middle of tibiæ, with other independent lines. Tarsi large, well developed, fuscous; middle and hind femora black; tibiæ yellow, with an external dark mark, tarsi fuscous. Abdomen smooth and shining as usual, yellow fasciæ as in *T. cribrellifer*, but they are broader and heavier, not indented, the stripes being continuous across the abdomen on the fourth and fifth rings; edge of sixth ring obscurely yellow, tip spatulate, a little hirsute. Length of body, .42; head and thorax, .20; abdomen, .22 inch.

"Brunswick, Maine. August, on flowers of *Spiræa alba*.

"Easily known by its short, dark, shield-shaped plate or vexhillum, which is as broad as long, and the presence of a yellow band on the meso-scutellum; its simple, non-expanded antennæ, the fuscous yellow spot on the thorax, and entire non-indented abdominal fasciæ. It is of the same size as *T. cribrellifer*, but a little shorter.

"♀. A female specimen received from Mr. Sanborn differs from the other sex by its shorter head, more deeply excavated front, and more convex vertex; the clypeus is longer, scape of antennæ more thickened, otherwise the color is the same. The thorax is sculptured and spotted the same, but the enclosure of the propodeum is more deeply furrowed and rugose on each side of the mesial furrow. Fore and middle legs colored as in *S. pegasus*, internal ring and two remote fasciæ one-half narrower than in *T. pegasus*, where they form a broad, scarcely interrupted band; terminal band narrower, tip of abdomen a little broader. This ♀ will probably be eventually found to be the ♀ *signifer*, differing likewise from *T. pegasus* ♀ in its brighter yellow spots and different arrangement of the abdominal fasciæ.

"Mass. (Sanborn)."

Belongs, no doubt, to group *tenuiglossus*.

SYNOPSIS OF THE SPECIES.*

FEMALES.

Epimerum mesopleuralis armed with a distinct crest or ridge before the middle coxæ, striated, punctato-striate, or striato-punctate. ..... 2.

Epimerum mesopleuralis not crested or ridged, at most with a small, pointed projection before the middle coxæ, punctured, rarely striated ..... 33.

2.—Anterior margin of clypeus produced into a strong, truncated process in the middle ..... 3.

Anterior margin of the clypeus not strongly produced in the middle, usually rounded ..... 14.

3.—Head and thorax very coarsely sculptured, being covered with large punctures, the dorsulum, scutellum and mesopleuræ frequently with strong striations interspersed with punctures 4

Head and thorax not very coarsely sculptured, the head rather finely and closely punctured; mesopleuræ striated 7

4.—Pronotum very large, strongly crested, and with the lateral tooth large and strong; a broad band on dorsal abdominal segments 1–5 and ventral segments 2–6 more or less, and greater part of femora, yellow.
cinctellus.

Pronotum not remarkably large, its crest, however, sharp, the lateral tooth small; at the most, the fourth and fifth dorsal abdominal segments banded, the ventrals never maculated; greater part of femora black rarely otherwise ..... 5.

5.—Abdomen with strong, distinctly separated punctures; middle segment on the sides strongly striated ..... 6.

Abdomen finely and closely punctured, shining; middle segment on sides not strongly striated, smooth medially (none of the abdominal spots united into bands) ..... **producticollis.**

6.—Punctures of the head extremely large, deep and well separated, those on the abdomen also coarse but less so than on the head; spots on dorsal abdominal segments 4 and 5 always separated ..... **interruptus.**

Punctures of the head strong, but much less than in *interruptus*, and closer, especially between the ocelli and occiput; punctures of the abdomen somewhat finer than those of the head; dorsal abdominal segments 4 and 5 with the spots united into bands ..... **bellus.**

7.—Ocelli forming a low triangle, tending to a curved line; pronotum distinctly dentate laterally; first joint of flagellum distinctly shorter than the following three combined ..... 8.

Ocelli forming an equilateral triangle; pronotum rounded at the sides, not dentate; first joint of flagellum as long, or nearly so, as the combined length of the following three joints 12

8.—Space between the eyes at base of clypeus at least equal to the length of joints 1 and 2 of flagellum united; transverse impressions of pronotum narrow, not strong ..... 9.

Space between the eyes at base of clypeus not equal to the length of joints 1 and 2 of flagellum united; pronotal impressions broad, especially toward the sides ..... 11.

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* The species, which the author has been unable to identify, are not included in this table.

9.—Pronotum sharply margined anteriorly, the lateral tooth large and sharp; longitudinal furrow of middle segment not broad, or widened medially (markings usually whitish; all the abdominal spots separated; scape and mandibles more or less whitish yellow) ..... **montanus.**

Pronotum obtusely or not at all margined, the lateral tooth rather small and blunt; longitudinal central furrow of middle segment broad and distinctly widened in the middle ..... 10.

10.—Pronotum not margined; posterior face of middle segment not ridged above; scape entirely black; markings on fifth segment united, those on fourth nearly so ..... **atriceps.**

Pronotum distinctly, though not strongly margined; posterior face of middle segment bounded above by a distinct ridge; scape in part yellow; markings on the abdomen all separated ..... **brunneipes.**

11.—Scutellum with sparse punctures on anterior portion, striated posteriorly; middle segment above generally with tolerably fine striations; thorax except the tubercles, rarely maculated; femora entirely and inner portion of tibiæ, black ..... **parvulus.**

Scutellum finely striated throughout; middle segment above with coarse folds or rugæ; pro- and metanotum always maculated; femora at tips and greater part of tibiæ, yellow ..... **corrugatus.**

12.—First joint of flagellum fully as long as the three following united; posterior face of middle segment with feebly developed lateral ridges ..... 13.

First joint of flagellum scarcely as long as the three following united; posterior face of middle segment with scarcely a trace of lateral ridges (no distinct transverse series of foveæ on middle segment) ... **nigrifrons.**

13.—Middle segment with a transverse series of strong foveæ separating the upper surface from the posterior face; pedicellum more or less yellow. Species Eastern ..... **obscurus.**

Middle segment without a distinct series of foveæ separating the upper surface from posterior face; pedicellum black. Species Western. **gracilissimus.**

14.—Dorsulum not striated, either finely or rugosely punctured ..... 15.

Dorsulum finely striated, transversely so on anterior portion, longitudinally on remainder ..... 32.

15.—Pygidium much narrowed apically, depressed or excavated ..... 16.

Pygidium broad, triangular, flat, not depressed or excavated ..... 29.

16.—Abdomen dorsally indistinctly punctured, or impunctate; pygidium always with a lateral fringe of long, thick hairs; head always finely and closely punctured ..... 17.

Abdomen dorsally distinctly punctured, usually strongly so, particularly the first segment ..... 19.

17.—Form broad, the first segment of abdomen not narrowed or lengthened, the abdominal markings long, narrow; pygidium with the apex obtuse or rounded; second ventral segment with large, much scattered punctures. 18.

Form narrower, the first segment of abdomen narrowed and lengthened, though not very strongly so, the abdominal markings short, more or less rounded; pygidium acutely pointed at apex; second ventral segment with strong, separated, though not scattered, punctures. **paucimaculatus.**

18.—Middle segment not marked by foveæ between the upper surface and the posterior face, the latter striato-punctate as above; dorsulum with the punctures close throughout, those on posterior portion but little or not at all separated ..... **sexmaculatus.**

Middle segment with the upper surface and posterior face separated by a series of strong foveæ, the posterior face transversely rugose; dorsulum with the punctures on posterior portion distinctly separated. **trifasciatus.**

19.—Pygidium without the lateral fringe of stiff hairs, or it is but feebly represented; head with strong, sometimes large, separated punctures, except in one case ..... 20.

Pygidium with the lateral fringe always present and distinct; head with close, rather fine punctures ..... 25.

20.—Head and first segment of abdomen with strong, separated punctures; pronotum with lateral tooth small and indistinct, or absent ..... 21.

Head rather finely and closely punctured, the punctures of the first abdominal segment more distinct and separated, but scarcely stronger; pronotum with a strong, distinct tooth, or rather spine, on each side (abdominal segments 2–5 with a lateral spot) ..... **spiniferus.**

21.—Trochanters, femora and tibiæ in part, reddish 22

Trochanters, femora basally or entirely, black ..... 23.

22.—Space between the eyes at base of clypeus fully equal to the width of the latter in the middle; space between hind ocelli somewhat less than that between them and nearest eye-margin; no yellow on scutellum or episternum mesopleuralis (second abdominal segment with a broad band, the remaining apical segments either narrowly banded, or with the bands broken into spots, which sometimes are only evident at the sides). **scaber.**

Space between the eyes at base of clypeus somewhat less than the width of the latter in the middle; space between hind ocelli about equal to or slightly greater than that between them and the nearest eye-margin; scutellum and episternum mesopleuralis more or less yellow (all the dorsal abdominal segments with a lateral spot, else the second banded and the spots on remaining segments disappear; first and second segments usually more or less rufous) ..... **rufipes.**

23.—Abdomen with segments 2, 4 and 5 banded with yellow; first segment very strongly punctured ..... 24.

Abdomen never banded, with a lateral spot on segments 2, 4 and 5, the third segment rarely spotted, the second segment still more rarely; first segment not very strongly punctured ..... **stirpicola.**

24.—Wings dark subhyaline, paler basally; head coarsely punctured, most sparsely so posteriorly; femora apically and tibiæ entirely, yellow; tarsi reddish yellow; third abdominal segment with a small lateral spot .. **texanus.**

Wings subhyaline, slightly darker apically, with a strong yellow streak along the costa; head evenly, though strongly punctured, more finely, and closely so posteriorly; femora black, except hind pair, which have a reddish streak within; tarsi black; third abdominal segment with a band ..... **centralis.**

25.—Dorsulum with strong punctures, separated on posterior portion; abdominal spots nearly always all widely separated, rarely forming bands on last two segments; middle segment strongly punctured above (femora in part reddish, trochanters black) ..... **decemmaculatus.**

Dorsulum closely and rather finely punctured throughout; abdomen always more or less banded; middle segment striated above (femora red in one case only, in which case the trochanters are also of that color) ..... 26.

26.—First dorsal segment of abdomen with the punctuation much more distinct than on the remaining segments ..... 27.

First dorsal segment with the punctuation but little more distinct than on the remaining segments ..... 28.

27.—Ocelli forming a low triangle; greater part of femora and the tibiæ in part, black; first abdominal segment and the ventrals not spotted; dorsulum very compactly punctured ..... **odyneroides.**

Ocelli forming a curved line; legs red and yellow; abdomen beneath and on first dorsal segment spotted; dorsulum posteriorly with the punctures less compact ..... **imbutus.**

28.—Femora black at extreme base only, the tibiæ without an internal dark spot; abdominal markings large and broad, the ventral segments more or less maculated ..... **Packardii.**

Femora black except apex, the tibiæ with a dark spot within; abdominal markings rather slender, the ventral segments not maculated. **chrysarginus.**

29.—Head and thorax not densely hirsute; abdomen not maculated ventrally, the first dorsal segment spotted on each side; pronotum sharply margined or ridged anteriorly; hind ocelli not placed behind an imaginary line drawn across the vertex from the outer orbit of one eye to the other. 30.

Head and thorax with dense, shaggy hair; ventral segments of abdomen 2–5 almost entirely yellowish, the first dorsal with a transverse band; pronotum convex, not margined anteriorly; hind ocelli placed behind an imaginary line drawn across the vertex from the outer orbit of one eye to the other ..... **villosus.**

30.—Head and abdomen rather finely punctured; dorsulum with the punctures close and not very coarse ..... 31.

Head and abdomen, particularly the first dorsal segment, rather coarsely punctured; dorsulum coarsely cribrose (femora more or less reddish). **rufifemur.**

31.—Markings yellow; middle segment posteriorly with a yellow spot on each side; tibiæ not spotted internally; femora above generally with a yellow stripe reaching almost to the base ..... **bigeminus.**

Markings whitish yellow; middle segment not spotted; tibiæ with a black spot within; basal half of femora usually black ..... **dilectus.**

32.—First joint of flagellum longer than the two following united; marks on second abdominal segment pointed internally, those on fifth widely separated ..... **singularis.**

First joint of flagellum distinctly shorter than the two following united; marks on second abdominal segment broadest internally, those on fifth forming a band ..... **aciculatus.**

33.—Abdomen not petiolate, more or less sessile ..... 34.

Abdomen petiolate, the petiole more or less nodose at apex ..... 77.

34.—Abdomen always spotted and marked.....35.
Abdomen never spotted, entirely black, or red.....58.
35.—Pygidium broad, flat, not excavated or depressed.....36.
Pygidium narrowed apically and excavated.....55.
36.—First joint of hind tarsi distinctly longer than the longer spur of hind tibiæ.....37.
First joint of hind tarsi of about equal length to the longer spur of hind tibiæ.....54.
37.—First cubital transverse vein received by the marginal cell before its middle, the space between the recurrent nervure and the apex of the submarginal cell much greater than the width of the latter cell at apex.....38.
First cubital transverse vein received in about the middle of the marginal cell, the space between the recurrent nervure and apex of submarginal cell not or rarely greater than the width of the latter cell at apex.....41.
38.—First joint of flagellum distinctly shorter than the second; space between hind ocelli somewhat less than that between them and the nearest eye-margin; pygidium longitudinally rugose.....39.
First joint of flagellum distinctly longer than the second; space between hind ocelli slightly greater than that between them and the nearest eye-margin; pygidium coarsely punctured.....40.
39.—Pronotum with lateral tooth small and weak; pronotum entirely, scutellum and metanotum in part, yellow; second and third ventral abdominal segments spotted with yellow..... **cingulatus.**
Pronotum with lateral tooth strong; pronotum with two, sinuous yellow spots only; no yellow on scutellum, metanotum, or abdomen ventrally. **argus.**
40.—Space between eyes at base of clypeus not as great as the width of the latter in the middle; dorsulum finely and closely punctured, shining. **æqualis.**
Space between eyes at base of clypeus fully as great as the width of the latter in the middle; dorsulum rather strongly and closely punctured, subopaque..... **discretus.**
41.—Flagellum of antennæ (excluding the pedicellum) scarcely twice the length of the scape, about equal to the space between the eyes on an imaginary line drawn across the vertex before the hind ocelli.....42.
Flagellum (excluding pedicellum) more than twice longer than scape, greater in length than the space between the eyes on an imaginary line drawn across the vertex before the hind ocelli.....45.
42.—Head, thorax and base of abdomen with very long, shaggy, pale yellowish pubescence; middle segment coriaceous, strongly furrowed, above in the middle, apparently striated, though subtilely; punctuation of head feeble, the dorsulum with shallow, scattered punctures (first dorsal segment maculated with yellow)..... **thyreophorus.**
Head, thorax and base of abdomen nude, except the usual silvery pubescence on clypeus, thorax beneath, etc.; middle segment above coarsely sculptured; sculpture of head and dorsulum distinct (first dorsal abdominal segment rarely maculated with yellow).....43.
43.—Wings except extreme apex, subhyaline; punctuation of mesopleuræ feebler and sparser than in *incertus;* scutellum rarely maculated with yellow.44.
Wings on apical half subfuscous; mesopleuræ with large, separated, though

not sparse punctures; scutellum and metanotum maculated with yellow; segments 2–5, sometimes the first with a large yellow spot on each side, those on the fifth connected; all the tarsi yellowish testaceous.

incertus.

44.—Space between the eyes beneath at the base of clypeus about equal to the length of the pedicellum and first joint of flagellum united, at any rate not less; mesopleuræ, in addition to the punctuation, with a delicate striation, sometimes scarcely evident (hind tarsi blackish).

tenuiglossus.

Space between the eyes beneath at the base of clypeus somewhat less than the length of the pedicellum and first joint of flagellum united; mesopleuræ not striated (hind tarsi yellowish testaceous)..... **tumidus.**

45.—Sculpture of head and thorax subtile, rather indistinct, apparently with shallow punctures (middle segment above with longitudinal ridges, less distinct than usual; markings whitish; clypeus and scape, except apex, black; head and thorax clothed with thin, pale, long pubescence).

vernalis.

Sculpture of head and thorax, particularly that of the dorsulum, well marked..... 46.

46.—Middle segment above very coarsely sculptured; with strong, longitudinal or somewhat oblique ridges, which extend to base of posterior face... 47.

Middle segment above not so coarsely sculptured; if it is, then the ridges become obsolete toward the posterior face (in one case with close, rather fine longitudinal striæ)..... 50

47.—Scape entirely black except a narrow ring at apex (space between hind ocelli slightly less than that between them and nearest eye-margin; spot on scutellum; spots on first abdominal segment separated. **Provancheri.**

Scape yellow, at least anteriorly..... 48.

48.—Dorsulum rather finely punctured; middle segment above with the furrow broad, shallow, and usually with a short longitudinal ridge anteriorly in the middle; pronotum not distinctly dentate, laterally yellow (markings yellowish white; scape black posteriorly; hind tibiæ whitish at base only; size small)..... **tennis.**

Dorsulum strongly punctured; middle segment above with the furrow deep; pronotum distinctly dentate laterally..... 49.

49.—Space between hind ocelli about equal to or a little greater than that between them and the nearest eye-margin (first abdominal segment with two separate spots, the marks on second segment pointed internally; tips of femora not yellow)..... **advenus.**

Space between hind ocelli less than that between them and the nearest eye-margin (first abdominal segment with a broad transverse band, the marks on the second segment truncate within; tips of all the femora more or less yellow)..... **conspicuus.**

50.—Middle segment above with a somewhat triangular depression; foveæ of the episternal suture of mesopleuræ less strongly marked than usual; markings white (dorsulum rather sparsely punctured; space between hind ocelli about equal to that between them and the nearest eye-margin; scutellum and metanotum whitish; first abdominal segment with a band, spots on segments 2 and 3 almost touching within, those on segments 4 and 5 uniting within as usual; ventral segments 2-4 with whitish maculations)..... **pallidus.**

Middle segment above without a triangular depression, at the most with a transverse series of foveæ at the base; foveæ of the episternal suture of mesopleuræ about as usual; markings yellow (no spot on metanotum).51.

51.—Space between hind ocelli decidedly less than that between them and the nearest eye-margin; middle segment with a well marked, triangular enclosure, which is longitudinally and closely striated; mesopleuræ above in addition to the punctuation, distinctly striated: dorsulum very compactly punctured (first abdominal segment with a band; extreme tips of femora yellow) ..... **pleuralis.**

Space between hind ocelli not much less than that between them and the nearest eye-margin: middle segment without a well-marked enclosure, the furrows forming it obsolete basally; mesopleuræ (episternum excepted) not striated; dorsulum with the punctures more or less separated ..... 52.

52.—Clypeus and mandibles black; femora not yellow at tips; lateral markings on dorsal abdominal segments 3 and 4 slender, more or less sinuous; second ventral segment only maculated; hind tarsi except first joint, blackish (middle segment above with some coarse longitudinal ridges, which do not reach the base of the posterior face) .... **monticolus.**

Clypeus and mandibles more or less yellow, rarely black; lateral markings on dorsal abdominal segments 3 and 4 broad, not at all sinuous; second and third ventral segments maculated, hind tarsi yellow testaceous..53.

53.—Thorax with thick, matted pubescence of a pale fuscous color. Length 14 mm. or over..... **largior**

Thorax with thin, pale grayish pubescence. Length 10 mm. or less. **vicinus.**

54.—Middle segment above with the central, longitudinal furrow wide, shallow and much broadened basally, the furrow which margins the lateral ridges of posterior face outwardly not or indistinctly foveolate; episternum mesopleuralis entirely black..... **cognatus.**

Middle segment above with the central, longitudinal furrow narrower, deep, scarcely broadened basally, the furrow which margins the lateral ridges of posterior face outwardly, distinctly foveolate or marked by strong, transverse ridges; episternum mesopleuralis more or less yellow. **hilaris.**

55.—Lateral ridges of posterior face of middle segment not strongly developed, generally obsolete above the middle..... ....56.

Lateral ridges of posterior face of middle segment very strongly developed, not obsolete above, usually reaching the furrow which forms the enclosure on upper surface..... **maculipennis.**

56.—Viewed from the side the lateral angles of the head are seen to be prominent and more angular than usual (mandibles, a transverse band on dorsal abdominal segments 1–5, and ventral segments 2–5, yellow). **ventralis.**

Viewed from the side the lateral angles of the head are not more prominent than usual, rounded (mandibles black, dorsal abdominal segments 2–4 with a large yellow spot on each side, the fifth sometimes with a continuous band, ventrals entirely black).....57.

57.—Head and thorax shining, the punctures tolerably fine, though not close; the furrow which margins the lateral ridges of posterior face of middle segment outwardly, rather strongly foveolate (episternum of the mesopleuræ and two spots on upper surface of middle segment, yellow). **nitidiventris.**

Head and thorax subopaque, the punctures fine and very close; furrow which margins the lateral ridges of posterior face of middle segment outwardly not foveolate (no yellow on episternum mesopleuralis or middle segment). **confertus.**

58.—Pygidium broad, flat, not excavated.....59.

Pygidium narrowed apically and excavated.....71.

59.—Recurrent nervure received by the submarginal cell in the middle, or about the middle.....60.

Recurrent nervure received by the submarginal cell between middle and apex (ocelli forming a low triangle); head and thorax with long, dark shaggy hair; entirely deep black..... **hispidus.**

60.—Ocelli forming a curved line; mandibles simple at apex.....61.

Ocelli forming an equilateral triangle; mandibles dentate at apex..... 64.

61.—The two convexities of the enclosure of middle segment smooth, polished (hind tibiæ yellow at base only; clypeus black)..... **erraus.**

The two convexities of the enclosure of middle segment distinctly and obliquely striated, subopaque.....62.

62.—Hind tibiæ yellow at base only; space between the eyes beneath, at their nearest point of convergence, about equal to a little more than half the length of the scape; form robust; head large.....**pinguis.**

Hind tibiæ, except a dark blotch within, yellow; space between eyes beneath, at their nearest point of convergence, decidedly greater than half the length of scape; form and head as usual in species of this section....63.

63.—Space between the eyes beneath, at their nearest point of convergence, about equal to two-thirds the length of the scape; clypeus and scape entirely yellow.....**flavielypeus.**

Space between eyes beneath, at their nearest point of convergence, equal to about five-sixths the length of the scape; clypeus black, the scape yellow in front only.....**latifrons.**

64.—Antennæ entirely and four anterior legs, fulvous; apical margins of abdominal segments broadly testaceous.....**similis.**

Antennæ in greater part black, as is likewise the greater part of the four anterior legs.....65.

65.—Mandibles yellow in greater part.....69.

Mandibles not yellow, black, reddish apically.....66.

66.—Scutellum almost entirely yellow (rarely black), as is likewise the outer side of medial tibiæ; yellow on pronotum forming a continuous band....67.

Scutellum black, or with a minute spot; the medial tibiæ yellow on basal portion only; yellow on pronotum broken into two, widely-separated spots.....68.

67.—Abdomen somewhat longer than head and thorax united, the first segment not broad and narrowed basally; episternal furrow of mesopleuræ forming an angle at about its middle. Length 6 mm.....**scutellatus.**

Abdomen a little shorter than head and thorax united, the first segment broad; episternal furrow of mesopleuræ gently curved. Length 4.5-5 mm. **lentus.**

68.—Basal excavated portion of middle segment including at least half of the enclosed area, with fine longitudinal ridges or striations; first joint of hind and medial tarsi yellow.....**incavus.**

Basal excavated portion of middle segment not including half of the enclosed area and forms little more than a deep, foveolated furrow; tarsi not at all yellow.....**sulens.**

69.—Scutellum immaculate.....70.

Scutellum maculated with yellow; episternal furrow of mesopleuræ sinuous (clypeus spotted with yellow).....**maculiclypeus.**

70.—Episternal furrow of mesopleuræ forming an obtuse angle at about the middle; two convexities of the enclosure of middle segment smooth, glabrous.....**propinquus.**

Episternal furrow of the mesopleuræ not angular, almost straight, or slightly curved; the two convexities of the enclosed area of middle segment with microscopic striations, opaque.....**minimus.**

71.—Pronotum not ridged or margined, rounded at the sides.....72.

Pronotum strongly ridged, dentate laterally; head quadrate, nearly as long as broad; tibiæ and tarsi yellowish; otherwise black.....**insolens.**

72.—Thorax not maculated with yellow.....73.

Pronotum and scutellum yellow; apical margins of abdominal segments broadly testaceous.....**impressifrons.**

73.—Enclosure of middle segment very strongly marked, the impressed lines forming it more or less foveolate.....74.

Enclosure of middle segment not strongly marked, rather indistinct, the lines forming it not foveolate.....76.

74.—Posterior face of middle segment transversely rugose, lines forming the enclosure very broad and deep, strongly foveolate.....75.

Posterior face of middle segment rugose on apical portion only; lines forming the enclosure neither broad nor deep, not strongly foveolate (legs and antennæ entirely black).....**ater.**

75.—Base of hind tibiæ yellowish; enclosure of middle segment bounded outwardly by a narrow, smooth strip, which is broadest basally.....**cinctipes.**

Hind tibiæ entirely black; enclosure of middle segment bounded outwardly by a broad, smooth strip, which is broadest apically.....**nigror.**

76.—Pronotum with a small, blunt prominence laterally; head with distinct punctures, those of the front particularly so; medial channel of posterior face of middle segment elongate fusiform; all the tarsi brownish.
nigricornis.

Pronotum without a prominence of any sort laterally; head indistinctly punctured, the front likewise; medial channel of posterior face of middle segment broad above, pointed apically; fore and medial tarsi yellowish testaceous.....**Harringtonii.**

77.—Epimerum mesopleuralis distinctly ridged anteriorly.....78.

Epimerum mesopleuralis not at all ridged anteriorly.....79.

78.—Petiole of abdomen nearly as long as the two following segments united, narrow, but little nodose at apex; head longer than broad and with the thorax coarsely punctured; greater part of abdomen red.
abdominalis.

Petiole of abdomen but little longer than the second segment, stout, distinctly nodose at apex; head transverse, broader than long and with the thorax finely punctured; abdomen entirely black.....**decorus.**

79.—Petiole of abdomen longer than the following segment, slender; coxæ yellow; anterior margin of clypeus angularly produced.....80.

Petiole of abdomen shorter than the following segment, robust; coxæ black (anterior margin of clypeus with a slight, square production; base of metathorax with a transverse row of short rugæ).....**occidentalis.**

80.—Abdomen black, not banded with reddish; four anterior legs banded with black.....**pedicellatus.**

Abdomen black, the anterior half of the third segment reddish; four anterior legs yellowish, not banded.....**rufogaster.**

MALES.

Epimerum mesopleuralis armed with a distinct crest or ridge before the middle coxæ, striated, punctato-striate or striato-punctate; antennæ 12-jointed.2.

Epimerum mesopleuralis not crested or ridged, at the most with a small pointed prominence before the middle coxæ, punctured, rarely striated; antennæ 13-jointed.....31.

2.—Anterior margin of clypeus produced into a strong, truncated process, not so prominently, however, as in the females.....3

Anterior margin of clypeus not strongly produced medially, usually rounded.....14.

3.—Flagellum entire, not dentate or emarginate; sculpture very coarse on head and thorax; first joint of medial tarsi sinuated; fore tarsi slightly flattened.....4.

Flagellum either dentate or emarginate beneath; sculpture less coarse; first joint of medial tarsi not sinuous, differing in the different species; fore tarsi distinctly flattened.....6.

4.—Flagellum not broadened basally, being narrowed from apex, the second joint longer than broad; abdomen coarsely punctured.....5.

Flagellum a little dilated basally, the first joint only narrowed; the second joint broader than long, as are also several of the succeeding joints; abdomen with tolerably strong, not coarse, even punctures.
producticollis.

5.—Head between the ocelli and occiput covered with very large, deep, non-confluent punctures, those on the abdomen also strong, but less so than on the head; abdomen with one, more rarely with two or three terminal bands.....**interruptus.**

Head between the ocelli and occiput with coarse, confluent punctures, less strong than in *interruptus*, those on the abdomen also finer and closer; abdomen with three, rarely with less, terminal bands.....**bellus.**

6.—Ocelli forming a low triangle, tending to a curved line; pronotum distinctly dentate laterally; first four joints of flagellum strongly contracted basally and produced a little at apex, the first and fourth most strongly.7.

Ocelli forming an equilateral triangle; pronotum rounded at the sides not dentate; first three or four joints of flagellum produced into a huge tooth beneath.....12.

7.—First joint of medial tarsi shorter than the three following united, at any rate not longer.....8.

First joint of medial tarsi longer than the three following united.....10.

8.—Occiput and cheeks strongly and sharply margined behind; pronotum large, very strongly crested anteriorly, the lateral tooth large and sharp; central longitudinal furrow of middle segment not broad; scape and first abdominal segment marked with yellowish.....**montanus.**

Occiput and cheeks not strongly margined; pronotum not very large nor strongly margined, the lateral tooth short: central longitudinal furrow of middle segment broad.....9.

9.—Scape entirely black; occiput scarcely margined posteriorly; markings whitish yellow.....**atriceps.**

Scape yellow in part; occiput distinctly margined posteriorly; markings bright yellow.....**brunneipes.**

10.—Pronotum with the transverse furrow very broad and shallow, particularly toward the sides; greater part of tibiæ yellow, the pronotum and metanotum always spotted.....11.

Pronotum with the transverse furrow not very broad, but deep; greater part of tibiæ black.....**parvulus.**

11.—Abdomen broad, not longer than head and thorax united; posterior face of middle segment distinctly enclosed; scape entirely yellow.

corrugatus.

Abdomen elongate, longer than head and thorax united; posterior face of middle segment not distinctly enclosed in consequence of the ridge, dividing it from the upper surface being more or less obsolete; scape only in part yellow.....**denticulatus.**

12.—Joints 1 and 2 of flagellum with a huge tooth or production beneath, the third and fourth joints much less distinctly toothed, the combined length of the first two joints as great as that of joints 3-6; fore femora black and yellow.....13.

Joints 1–4 of flagellum equally dentate beneath, the combined length of the first two joints not greater than that of joints 3 and 4; fore femora rufous, striped with black and yellow.....**nigrifrons.**

13.—Sides of middle segment coarsely striated, upper surface and posterior face coarsely rugose. Species Eastern.....**obscurus.**

Sides of middle segment rather finely striated, upper surface and posterior face only tolerably rugose. Species Western.....**gracilissimus.**

14.—Dorsulum not striated, either finely or rugosely punctured.....15.

Dorsulum striated, transversely on anterior portion, posteriorly longitudinally so (fore femora beneath armed with a sharp spine).....29.

15.—Abdomen above not distinctly punctured, or impunctate.....16.

Abdomen above distinctly punctured, particularly the first segment.....17.

16.—First and second joints of medial tarsi very strongly produced at apex within, almost spinose; first joint of the flagellum distinctly longer than the second; fore femora reddish anteriorly.....**sexmaculatus.**

First and second joints of medial tarsi scarcely produced at apex within; first joint of flagellum but little longer than the second; fore femora in front yellowish.....**trifasciatus.**

17.—Fore tarsi not or but slightly flattened; the first joint of medial tarsi not angular.....18.

Fore tarsi distinctly flattened; the first joint of medial tarsi short, more or less angular.....26

18.—Antennæ more or less emarginate beneath.....19.

Antennæ entire, subclavate, not emarginate.....28.

19.—Head with large, separated punctures, except in one case; middle segment laterally, at least the posterior face, with a series of strong foveæ.....20.

Head closely and rather finely punctured; middle segment without lateral foveæ.....24.

20.—Abdomen above, particularly the first two segments, coarsely punctured, and more or less banded.....21.

Abdomen strongly, though not coarsely punctured above, not banded, but with lateral spots.....23.

21.—First joint of medial tarsi strongly curved; space between the eyes at base of clypeus not greater than the width of the latter in the middle; trochanters and femora reddish, not black.....**scaber.**

First joint of medial tarsi not or scarcely curved; space between eyes at base of clypeus greater than the width of the latter in the middle...22.

22.—Legs not at all black, rufous and yellow; mandibles not yellow, but a spot on episternum mesopleuralis; abdomen more or less rufous; pronotum strongly dentate laterally.....**rufipes.**

Coxæ, trochanters, femora except apex and spot on tibiæ internally, black; mandibles spotted with yellow, but no spot on episternum mesopleuralis; abdomen not at all rufous; pronotum with the lateral tooth small. **texanus.**

23.—Pronotum with a large, strong tooth on each side; head rather finely and closely punctured.....**spiniferus.**

Pronotum but slightly dentate; head with large, separated punctures. **stirpicola.**

24.—First joint of flagellum not nearly as long as the two following joints united, not more than one-quarter longer than the second.....25.

First joint of flagellum nearly as long as the two following united, more than one-quarter longer than the second (femora at apex broadly, and greater part of tibiæ and tarsi, yellow).....**chrysarginus.**

25.—Greater part of femora black; wings not or but slightly yellowish; dorsulum compactly punctured; abdomen ventrally not spotted; first joint of medial tarsi longer than the three following united...**odyneroides.**

Legs fulvous and yellow; wings strongly yellow on basal half; dorsulum posteriorly with the punctures tolerably well separated; abdomen more or less spotted ventrally; first joint of fore tarsi shorter than the following three united.....**imbutus.**

26.—First joint of medial tarsi strongly angular on outer margin, shorter if anything than the following two joints united; sculpture of dorsulum not exceeding coarse; epimerum mesopleuralis usually with a yellow spot.27.

First joint of medial tarsi but slightly angular on outer margin, slightly longer than the two following joints united; sculpture of dorsulum exceedingly coarse; episternum mesopleural is not spotted.**rufifemur.**

27.—Segments 2–6 of abdomen with a band; tibiæ spotted internally.**dilectus.**

Segments 4 and 5 (possibly the third sometimes) with a band; tibiæ not spotted within.....**bigeminus.**

28.—Anterior trochanters armed with a strong spine or tooth beneath: femora fulvous in greater part; lateral spots or lines on abdominal segments 1–4, a narrow band on the sixth, the ventral segments not marked with yellow **10-maculatus.**

Anterior trochanters simple, not spinose; femora not fulvous, yellow in greater part; all the dorsal abdominal segments with a broad band, the ventrals entirely yellow.....**Packardii.**

29.—Abdomen without bands, the spots all widely separated.....30.

Abdomen "with a broad yellow band at the base of fifth segment, the sixth entirely yellow."".....**aciculatus.**

30.—Head finely punctured above, shining, not or indistinctly striated; pronotum declining strongly to the sides, not as wide as the occipital margin of head, widely, though not very strongly, furrowed; middle femora beneath and greater part of middle tibiæ, black; no spots on scutellum. **singularis.**

Head strongly striato-punctate above, subopaque; pronotum declining but little toward the sides, as wide as the occipital margin of head, deeply furrowed; greater part of medial femora and their tibiæ entirely, yellow; scutellum with yellow spots..... **trapezoideus.**

31.—Abdomen not petiolate, more or less sessile.....32.

Abdomen petiolate, the petiole more or less nodose at apex.....64.

32.—Abdomen always spotted or marked with yellowish.....33.

Abdomen not spotted, entirely black.....53.

33.—Fore tibiæ bearing a large vari-shaped shield.....34.

Fore tibiæ without a shield, simple.....48.

34.—Antennæ more or less dilated, the joints more or less prolonged beneath; fifth joint of fore tarsi with a peculiar appendage.....35.

Antennæ simple, fifth joint of fore tarsi without an appendage.....42.

35.—First joint of flagellum broadened to meet the second, longer than the pedicellum, the four terminal joints as long as or longer than the four preceding joints united, none of the joints with a long, acute appendix on outer margin.....36.

First joint of flagellum not broadened to meet the second, not longer, though broader, than the pedicellum, the four terminal joints together about as long as the three preceding ones united, joints 2 6 with a large appendix on outer margin, that on joint 2 narrowest and most curved, that on joint 6 broadest and not curved (tibial shield brownish, yellow basally, covered with pale dots, which are at extreme base and apex, linear; scutellum and metanotum black; first abdominal segment banded; medial legs, coxæ excepted, entirely yellow, the first joint of their tarsi about twice as long as the remaining tarsal joints united)..... **argus.**

36.—First joint of flagellum with a bunch of pale, curled hair beneath.....38.

First joint of flagellum not hirsute beneath.....37.

37.—Tibial shield very large, fully two-thirds as long as the thorax, its under margin (the fore leg is supposed to be stretched out its entire length) with a medial lobe, or, in other words, is twice sinuated, black at base, streaked with paler, the apical two-thirds yellowish, with three large black streaks; flagellum broadest by far at the base, gradually narrowed to the apex; first joint of medial tibiæ distinctly more than one-third times longer than the remaining joints united; medial femora with a yellow streak before and behind..... **latipes** (= *coloradensis*).

Tibial shield comparatively small, not more than one-third as long as the thorax, its outer margin without a medial lobe, being once sinuated, the greater portion entirely black, toward the base, however, yellowish, streaked with darker; flagellum not much broadened, but widest medially and narrowed basally and apically; first joint of medial tibiæ somewhat less than one-third times longer than the united remaining joints; medial femora entirely black..... **medius.**

38.—Medial femora streaked with yellow anteriorly and posteriorly (scape entirely black behind; scutellum and metanotum black; tibial shield brownish

on apical two-thirds, greenish basally, where it is narrowly streaked with yellow; hind tibiæ at base and a line externally, yellow. Size small 8 mm.).....**tenuis.**

Medial femora yellow at apex only. Size larger.....39.

39.—No tooth or prominence at base of outer margin of fore femora, the latter with an internal spine only.....40.

A tooth or prominence at the base of outer margin of fore femora; markings yellow; medial legs with trochanters and greater part of femora black; metanotum marked with yellow; markings segments 1–3 separated, those on segment 1 sometimes meeting; dorsulum compactly punctured.41.

40.—In shape the fore femora are triangular, being almost as broad at base as they are long; first joint of medial tarsi not much longer than the remaining joints united; markings white; medial legs entirely, coxæ excepted, scutellum and postscutellum whitish; marks on abdomen all touching within.....**pallidus.**

In shape the fore femora somewhat oblong, flattened, fully three times *broader* than long; first joint of medial tarsi about one-third longer than remaining joints united; markings yellow; greater part of medial femora black; marks on scutellum and postscutellum; marks on segments 1–3 separated.....**cribrellifer.**

41.—Anterior femora at the base of outer margin with a strong production, which is somewhat bifurcate at apex; space between hind ocelli much less than that between them and the nearest eye-margin; tibial shield basally yellow, posteriorly greenish, and streaked and dotted with yellow.

pleuralis.

Anterior femora at base of outer margin with a sharp tooth; space between hind ocelli but little less than that between them and the nearest eye-margin; tibial shield in greater part deep black, basally greenish and with broken streaks of yellow.....**largior.**

42.—Flagellum short, stout, not much more than twice the length of the scape.43.

Flagellum long, slender, at least half as long again as twice the length of the scape.....45.

43.—Mesosternum clothed with a dense, white pubescence; mesopleuræ in addition to the punctuation, with a delicate striation; medial tarsi rather strongly flattened (hind tarsi blackish; tibial shield brownish yellow at base and irregularly mottled with darker).....**tenuiglossus.**

Mesosternum naked; mesopleuræ not striated; medial tarsi not flattened; tibial shield brownish, with several yellow, longitudinal stripes medially.....44.

44.—Mesopleuræ sparsely and rather subtilely punctured; fore femora beneath yellow and greater part of tibiæ of that color; metanotum black.

tumidus.

Mesopleuræ rather closely and strongly punctured; fore femora entirely and greater part of tibiæ, black; metanotum yellow.....**incertus** (?).

45.—Mesopleuræ and scutellum coarsely striated; wings on apical half subfuscous (no yellow on thorax; tibial shield greenish, dotted with whitish or yellowish, and broadly bordered anteriorly with black).....**virgatus.**

Mesopleuræ (episternum excepted in one case) not coarsely striated, at the most striato-punctate above.....46.

46.—Head and thorax subtilely sculptured, clothed with unusually long pubescence; no suture between the epimerum mesopleuralis and the mesosternum; cheeks not keeled beneath.....47.

Head and thorax coarsely sculptured, not pubescent more than usual; a suture of about the same proportions as that which separates the episternum and epimerum mesopleuralis divides the mesopleuræ from the mesosternum and unites with the episternal suture so as to form a sharp angle; cheeks beneath along the eye-margin with a slight keel; clypeus yellow; tibial shield dark brown, darker anteriorly, marked with numerous, fine, yellowish streaks.....**pegasus.**

47.—Anterior trochanters very long, almost equaling their femora in length, and not much broadened apically; markings yellow; tibial shield broadly margined with black anteriorly, otherwise yellow, irregularly streaked with blackish medially; pubescence of head and thorax yellowish brown. **thyreophorus.**

Anterior trochanters not over half the length of their femora and considerably broadened apically; markings white; tibial shield greenish white, streaked with paler throughout; pubescence of head and thorax pale gray.....**vernalis.**

48.—Pronotum strongly dentate laterally; middle segment coarsely sculptured above, without enclosed smooth areas.....49.

Pronotum not dentate laterally, rounded; middle segment above with two convex enclosures.....51.

49.—Scape of antennæ compressed, broader by far at apex than at the base, flagellum stout, not thickened medially nor clavate; mesosternum with long, dense, white hair, wings hyaline (episternum mesopleuralis black).50.

Scape of antennæ cylindrical, not broader at apex than at base, flagellum tolerably slender, slightly subclavate; mesosternum with short, sparse, pale silvery pubescence, wings fusco-hyaline (episternum mesopleuralis and legs, almost entirely, yellow).....**hilaris.**

50.—Abdomen but little longer than head and thorax united, the sixth dorsal rarely spotted with yellow; fore femora beneath, toward base, with sparse, not long, white pubescence, at least not as long or as dense as that on the mesosternum laterally (fore and medial femora marked more or less with black).....**cognatus.**

Abdomen nearly twice as long as the head and thorax united, the sixth dorsal segment always spotted with yellow; fore femora beneath with dense, white pubescence, as long and as dense as that on the mesosternum laterally (fore and medial legs entirely yellow).....**cingulatus.**

51.—The furrow that margins the lateral ridge of posterior face of middle segment strongly foveolate.....52.

The furrow that margins the lateral ridge of posterior face of middle segment not foveolate (no yellow spots on middle segment)..**confertus.**

52.—Front and vertex rather coarsely punctured, the punctuation of the dorsulum, in comparison, distinctly finer and more even (markings pale yellow). **maculipennis.**

Front and vertex with even, distinct punctures, those of the dorsulum a little finer (markings bright yellow).....**nitidiventris.**

53.—Ocelli forming a curved line (fore tarsi not flattened).....54.

Ocelli forming an equilateral triangle.....55.

54.—Cheeks not spinose beneath, unarmed; convexities of enclosure of middle segment smooth, polished; hind tibiæ yellow at base only; clypeus and scape posteriorly, black ..... **errans.**

Cheeks with a strong spine beneath; convexities of enclosure of middle segment distinctly striated; hind tibiæ except a blotch within, clypeus and scape entirely, yellow ..... **armaticeps.**

55.—Fore tarsi not flattened or distorted ..... 56.

Fore tarsi greatly flattened, or the first joint twisted or distorted ..... 63.

56.—Ultimate dorsal abdominal segment distinctly more strongly punctured than the penultimate ..... 57.

Ultimate dorsal abdominal segment not, or scarcely, more strongly punctured than the penultimate 60

57.—Posterior face of middle segment transversely rugose ..... 58.

Posterior face of middle segment rugose at apex only (clypeus spotted with yellow) ..... **maculiclypeus.**

58.—Clypeus and greater part of scape, prosternum and fore coxæ and trochanters, black ..... 59.

Clypeus and scape entirely, prosternum, fore coxæ and trochanters, bright yellow ..... **pictipes.**

59.—"At the base of propodeum (middle segment) is a row of minute fossæ." **minimus.**

Base of middle segment with a wide, somewhat triangular, excavated area, which is longitudinally ridged; pronotum very strongly crested, angular at sides ..... **sulcus** (?).

60.—Thorax without yellow spots ..... 61.

Prothorax and scutellum yellow ..... **impressifrons.**

61.—Enclosure of metathorax with two large, smooth areas ..... 62.

Enclosure of metathorax with two small, indistinct, smooth areas. **cinctipes.**

62.—Legs entirely black; anterior margin of clypeus rounded out in the middle. **ater.**

Greater part of four anterior legs reddish; hind tarsi dark testaceous. **nigricornis.**

63.—Thorax not maculated with yellow; basal joint of fore tarsi twisted. **tarsalis.**

Prothorax, tubercles and scutellum marked with yellow; basal joint of fore tarsi greatly flattened, but not twisted ..... **planipes.**

64.—Episternum mesopleuralis ridged anteriorly; head and thorax coarsely punctured; petiole scarcely nodose at apex (antennæ simple, not dentate). **asperatus.**

Episternum mesopleuralis not ridged anteriorly; head and thorax finely punctured ..... 65.

65.—Antennæ not dentate or lobate beneath, simple; petiole of abdomen shorter than the following segment; coxæ black (scape and legs in part yellow; otherwise black) ..... **occidentalis.**

Antennæ more or less dentate or laminate beneath; petiole of abdomen longer than the following segment; coxæ yellow ..... 66.

66.—Abdomen black, not banded with reddish; four anterior legs more or less black; first joint of medial tarsi laminate internally .. **pedicellatus.**

Abdomen black, the third segment banded with reddish; four anterior legs entirely yellow; first joint of medial tarsi not laminate. **rufogaster.**

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A REVIEW OF THE STRATIOMYIA AND ODONTOMYIA OF NORTH AMERICA.

BY CHARLES W. JOHNSON.

The object of this paper is to try and make clear the specific characters of the species that have been placed in these two genera. That there are many synonyms in the present list is apparent to all who have attempted to determine the species. Of the species pertaining to the United States I have examined a great deal of material, and carefully studied all available types, but the want of material from Mexico leave many doubtful and undetermined species. That some of the species of Bellardi and Gerstaecker, described from Mexico, are the same as those described from Texas and California, seem evident, and if so, would have priority; yet it would be unadvisable to do this without a thorough study of the Mexican species. While varying considerable in many structural characters, these variations, when studied collectively, seem hardly sufficient to be of generic importance. I therefore refrain in this present paper from adopting any additional genera until typical specimens of described genera have been studied.

I here wish to express my sincere thanks to Mr. Samuel Henshaw, through whose kindness I was permitted to examine the type in the Museum at Cambridge; to Dr. S. W. Williston and Mr. W. A. Snow, of the Kansas University, for the loan of specimens, the comparing of specimens with Day's types and valuable information; to Prof. C. V. Riley, for the privilege of examining the large collection in the National Museum; to Prof. Lawrence Bruner and Mr. W. D. Hunter, of the University of Nebraska; and to Prof. J. M. Aldrich, Mr. D. W. Coquillett, Dr. W. A. Nason, Prof. G. C. Davis, Mrs. Annie T. Slosson and others, for the generous loan of specimens.

STRATIOMYIA.

Stratiomys Geoffroy, Hist. Nat. d. In. ii, 475, 1764.
Stratiomyia, as amended by Loew, Centur. vi, 4.*

Rather large; black with yellow markings, pile or tomentum variable. Head hemispherical; eyes of the male contiguous, but

* "Geoffroy, in translating Reaumur's *Mouche armee*, evidently meant to make the name *Stratiomyia* and not *Stationys*, which is nonsensical" (Osten Sacken).

broadly separated in the female; ocelli prominent, face rounded, antennæ inserted slightly above the middle of the head; first antennal joint three or four times as long as the second; third joint as long as the first and second together; without style or bristle and composed of five annuli. Thorax quadrate, pilose in the male, tomentose in the female; scutellum prominent and always with two spines. Abdomen as long as the head and thorax together; ovate, thick and convex, with five visible segments. Legs of moderate size, with little variation; tibiæ without spurs. Wings brownish hyaline, veins reddish brown, anterior veins crowded, third longitudinal vein branched, discal cell emits three veins of equal size, thus forming five distinct posterior cells; discal cell subtriangular, first and second basal cells equal, anal cell always closed, seventh longitudinal vein rudimentary.

Type of the genus *S. chamæleon* Linné, of Europe.

In comparing our species with those of Europe, we find, as is quite characteristic of the North American fauna, that the species which nearest resembles the type are those from the Pacific slope: *S. barbata* and *S. nudastoma*. This remark also applies to the following note on *Thyreodonta* (*S. maculosa* Loew); and to the genus *Odontomyia*; a western species, *O. binotata*, being the nearest representative in size and color to *O. ornata* of Europe, although it extends much further east than the species of *Stratiomyia* referred to.

While the foregoing description applies to the typical forms, there are others included that show some modifications, but which are not of sufficient importance to be of generic value.

Rondani founded the genus *Thyreodonta* in "eyes hairy," type *S. strigata* Fabr. (*S. longicornis* Scop.), of Europe. To this would belong S. *maculosa* Loew, of California. But, when we come to our eastern species, *S. badius* Walk., we find that only the male has hairy eyes. This character, therefore, can be considered only of specific value, or at most a section or group.

There are several species found from Texas to South America which differ considerably from the typical form in general appearance, yet lack distinctive generic characters. The head of both male and female is much wider than the thorax, the third joint of the antennæ flattened and sublanceolate, the abdomen somewhat flattend, the anterior third of the wing a reddish brown color, and, as a rule, they are somewhat smaller. Gerstaecker (Linn. Entom. xi, 321) speaks of this differentiation. It is really a Mexican and South

American group, being represented, as far as known, by only one species within the United States—*S. constans* Loew, Texas. I propose for this the group *mutabile* from its typical and widest distributed species, *S. mutabilis* Fabr.

Of the life habits of the American species little is known. Dr. Williston (Standard Nat. Hist. vol. ii, page 416) gives the following account: "The larvæ lives in water, earth, or decaying wood. Those of a species of *Stratiomyia* are known to inhabit some of the western alkaline lakes, and a European species is found in salt water. The transformations of *S. chameleon* in Europe are well known. The eggs are deposited by the female in layers overlapping each other on the under side of leaves of aquatic plants. The larvæ are naked, smooth, broader in front, where there is a small head; the sides of the abdominal segments are provided with a hook-like foot process. The last three are much narrowed and elongated, the terminal are especially so, and at its tip with a circlet of hairs surrounding the stigmata. When they breathe these hairs enable the larvæ to keep themselves at the surface, and by their means, when folded, they can retain a small bubble of air and carry it with them beneath the surface. Their food consists of very small aquatic organisms. They swim about in vertical, undulatory motions. The pupæ are enclosed in the anterior end of the larval skin, which enables them to float about freely in the water. They escape at maturity through a slit in the back which has become exposed to the air." The perfect insects are generally found on flowers, and are noticeably more numerous in the vicinity of streams and ponds.

The following note from a recent article by Prof. Lawrence Bruner (*Evening Call*, Lincoln, Neb., April 5, 1895) on the peculiar habit of a Stratiomyid larva may prove of interest. The specimens were found by Mr. John C. Hamm in the thermal springs of Ninta County, Wyoming. * * * "At the time I saw the larvæ in their native habitation I did not have a thermometer with which to take the temperature, but the water was so hot where I saw them I could not hold my hand in it. My best judgment is, and was at the time, that the water was not more than twenty or thirty degrees below the boiling point." * * * "In color they are dull gray, in form much flattened, and in size the length of the line below the figure (15 mm.). The two specimens examined by me are more or less incrusted with sulphur and other mineral substances."

The number of species recorded from North America, in Osten

Sacken's Catalogue, is thirty-nine (ten from Mexico). Bigot has since described six, making a total of forty-five species. Macquart's *S. flavipes*, *S. puchella* and *S. vicina*, I can only refer to *Odontomyia flavicornis* Oliv. This synonymy has been caused by the unusual length of the first antennal joint, and in the great difference between the male and female. Loew's *S. angularis*, *S. marginalis* and *S. nigriventris*, are undoubtedly the same as *S. meigenii* Wied. Loew's *S. notata* and *S. quadrigemina* are only color varieties of *S. normula* Loew. *S. lativentris* and *S. obesa* Loew, are synonyms.

S. insignis is the ♂ of *S. maculosa* Loew (Osten Sacken, Western Diptera, 203).

S. lineata Macq. I refer doubtfully to *S. meigenii*. Of Walker's species *S. badius*, being positively identified, has priority over *S. picipes* Loew.

S. nymphis I refer doubtfully to *S. laticeps* Loew, the other five (three Mexican) remain unidentified. For a want of material none of the Mexican species (except *S. matabilis* Fabr.) have been identified; but, as they should be studied conjointly, I have added, for convenience, a description of all the species.

Of Bigot's species *S. dentata* ♀ and *S. lacerta* ♂ are unquestionably *S. maculosa* Lw. *S. diadenata* and *S. calopus* equals *S. barbata* Lw. A very black species from Weber Lake, California, I refer to *S. nevada*. *S. simplex* remains unidentified.

In the following table I have only included those Mexican species that from the descriptions seem undoubtedly distinct.

1.—Head of ♂ ♀ narrower than the thorax.....2.
Head of ♂ ♀ wider than the thorax.....6.
2.—Eyes of ♂ ♀ glabrous.....3.
Eyes of ♂ pubescent.....13.
3.—Antennæ; third joint but slightly flattened.....4.
Antennæ; third joint greatly flattened and sublanceolate.....14.
4.—Abdominal spots usually connected on the fourth segment of the male, and always connected on the fourth and usually on the third segment of the female.....5.
Abdominal spots never connected on the fourth segment of the ♂ and rarely connected in the ♀.....**barbata** Lw.
5.—Fifth segment with a large keystone-shaped marking.**melanostoma** Lw.
Fifth segment with a dorsal line and spot at the anterior angle.
lativentris Lw.
6.—Abdomen; lateral triangular markings on the second and third segments, widely connected at the lateral margin.....**Bruneri** n. sp.
Abdomen; lateral subtriangular markings on the second and third segments not connected at the lateral margins.....**laticeps** Lw.

7.—Scutellum yellow, or with base narrowly black.....8.
Scutellum black, or with a narrow apical margin of yellow.....10.
8.—Fourth segment with a small dorsal triangle, vertex of the ♀ black.
normula Lw.
Fourth and fifth segments with small dorsal triangles, vertex of the ♀ yellow..... **norma** Wied.
9.—Dorsal triangles on the third and fourth segments, that on the fourth (and sometimes the third) connected with the lateral margins.
unilimbata Lw.
Dorsal triangle wanting on the third, that on the fourth obsolete or wanting, wings unusually dark..... **senaria** Lw.
10.—Abdomen with narrow lateral markings.....11.
Abdomen wholly black ♂ (♀ unknown)..... **nevadæ** Bigot.
11.—Fifth segment with a dorsal line; lateral markings on the segments of the ♀ very narrow..... **Meigenii** Wied.
Fifth segment with a dorsal triangle; lateral markings on the segments of the ♂ ♀ prominent..... **apicula** Lw.
12.—Pile on the thorax unusually long and dense; abdomen wide, third and fourth segments very convex..... **discalis** Lw.
Pile on the thorax normal; abdomen narrow, and third and fourth segments noticeably convex..... **quaternaria** Lw.
13.—Face of ♀ yellow, ♂ black; abdomen with a wide, maculated or indentated lateral margin; variable..... **maculosa** Loew.
Face of ♂ ♀ yellow; with a longitudinal line of black; abdominal markings transverse, the same in both sexes; eyes of ♀ glabrous.
badius Walker.

Group *mutabile*.

14.—Abdomen; bands on the second segment interrupted, third and fourth continuous.....15.
Abdomen; fourth and fifth segments only with wide yellow bands.
mutabilis Fabr.
15.—Scutellum ♂ black.....16.
Scutellum ♂ ♀ yellow..... **constans** Lw.
16.—Abdomen; bands on the second and third continuous.
Gerstaeckeri Bell
Abdomen; second segment with two large spots..... **bimaculata** Bell.

Stratiomyia barbata Loew (Pl. iii, figs. 1 and 2).

Stratiomyia barbata Loew, Centur. vi, 9.
Stratiomys diademata Bigot, Ann. Soc. Ent. France, xxxviii, 23.
Stratomys calopus Bigot, Ann. Soc. Ent. France, xxxviii, 23.

♂ ♀. Length 13 mm. ♂.—Face black, with blackish pile around the base of antennæ, and yellowish pile below; a large spot on each side of the facial prominence, and the lateral and lower part of the occiput yellow; the occiput is laterally very prominent, apparently ending abruptly towards the vertex, where it becomes black and obscured by the eye, which extends to the edge of the vertical angle. Antennæ black. Thorax black, with blackish pile; scutellum yellow, base and sides black, spines reddish; halteres green. Abdomen black, with yellowish pile and lateral markings, second segment with a large triangular spot

at the posterior angles, third and fourth with an oblong spot at the lateral posterior margins narrowly reaching the posterior angles; a large central triangle on the posterior half of the fifth; venter black, the segments with a wide posterior margin of greenish yellow; femora black, with long, black pile; tips of the femora, the tibiæ and tarsi, reddish; tibiæ with a medial band of brown. Wings dusky hyaline, veins yellowish; discal cell emits three veins.

♀.—Face, front and vertex black, with yellow pile; a large, square spot on each side of the facial prominence, two ovate spots on the front, and one on each side of the ocelli extending over the vertical angle onto the cervex, and the occiput yellow. In some specimens the yellow of the face and front are connected at the orbits, in which case the face and front might be described as yellow, longitudinally divided by black; scutellum yellow, base narrowly black; the lateral abdominal markings usually the same as those of the male, though occasionally the markings on the fourth segment are narrowly connected.

Seattle, Wash. (Prof. O. B. Johnson); Mt. Hood, Oregon (Morrison, Univ. Kans.); Laramie, Wyoming, July 17 (Univ. Neb.); Colorado, July 8 (Amer. Ent. Soc.); Craig's Mt. Idaho; British Columbia (Aldrich).

Two females from Colorado, and two out of eight of the males from Craig's Mt. Idaho have the markings on the fourth segment narrowly connected.

Stratiomyia melanostoma Loew (Pl. iii. figs. 3 and 4).

Stratiomyia melanostoma Loew, Centur. vi, 10.

Length ♂ ♀ 12–15 mm. ♂.—Face yellow, with light yellow pile; frontal triangle, medial facial line and mouth, black; occiput totally yellow, lateral portions somewhat dilated. Antennæ black, second joint brownish. Thorax black, with blackish pile; a tuft of yellowish pile on the pleura below the humeri; scutellum yellow, base narrowly black, spines reddish. Abdomen black; a lateral posterior triangle on the second, an elongated spot on the lateral posterior margins of the third and fourth, which narrows toward the lateral margins, usually connected on the fourth; and a central disc or subtriangular spot on the fifth segment yellow; venter yellow, base of the segments variably marked with black, which is more conspicuous on the third and fourth segments; femora black, tips of the femora, the tibiæ and tarsi, yellowish; tibiæ obscurely annulated with brown. Wings brownish hyaline.

♀.—Face, front and occiput, yellow; vertex black, with a yellow spot on each side of the ocelli extending over the vertical angle; there is a narrow black fasciæ and frontal line that connects the black surrounding the base of the antennæ with that of the mouth and vertex; sometimes the frontal line is bifurcated, thus forming a yellow spot below the ocelli; there is also a small black spot on the orbit opposite the base of the antennæ, but this and the frontal line in some specimens is entirely wanting. The yellow spots on the third and fourth segments are larger and connected on both segments, thus forming irregular posterior borders; the discal spot on the fifth is also larger, leaving only a narrow lateral and anterior margin of black.

California (Baron); Mt. Hood, Oregon (Morrison, Univ. Kans.); Summit Station, Sierra Nevada, July 4 (H. Edwards).

Stratiomyia lativentris Loew (Pl. iii, figs. 5, 6).

Stratiomyia lativentris Loew, Centur. vi, 8.

Startiomyia obesa Loew, Centur vi, 11.

Length ♂ ♀ 13 mm. ♂.—Face and occiput yellow, pile yellow; a wide facial line, frontal triangle and mouth black. Antennæ black. Thorax black, with yellowish pile; scutellum and spine yellow, base black. Abdomen black; second, third and fourth segments with an elongated yellow spot at the lateral posterior margin, those on the fourth segment usually connected, forming a posterior margin; also a small spot at the anterior angle of the third, fourth and fifth segments; fifth with a narrow lateral margin and a dorsal line of yellow; venter yellow, segments with an irregular band of black at the anterior margins. Femora brownish, with a preapical band of black; tips of the femora, the tibiæ and tarsi yellow; tibiæ with a medial band of brown. Wings hyaline, brownish, somewhat lighter towards the end, veins reddish.

♀.—Face, front and occiput, yellow; vertex black, with two yellow spots on the vertical angle, in some specimens the black of the vertex extends along the frontal orbits and connects with a narrow transverse line that extends from the base of the antennæ; frontal fovea, mouth and a narrow facial line extending from the base of the antennæ to the mouth black; black at the base of the scutellum narrower than in the male. The abdominal markings are more prominent than the male, those on the third sometimes connected, thus forming a posterior margin to both the third and fourth segments; there is a prominent spot at the anterior angle of the second, third and fourth segments, on the fifth the spots at the anterior angles are sometimes connected with the dorsal line, leaving two triangular spots and a narrow anterior margin of black. Legs yellow; femora with a broad preapical band of brownish black.

Toronto, Ont., June 17, July 12 (Wm. Brodie); Buffalo, N. Y. (Kansas Univ.); Northumberland County, Pennsylvania (H. G. Klages); Agricultural College, Michigan (Davis); Champaign County, Illinois (W. A. Snow); Algonquin, Ill. (Dr. Nason); Brookings, S. D. (Aldrich).

In the type (♀) the abdominal markings are intermediate between the ♂ and ♀ figured, the markings on the second segment are more triangular, those at the anterior angles wanting, while the fifth segment is like that of the ♂. In the nine specimens before me there is a great variation in the abdominal markings.

Stratiomyia Bruneri n. sp. (Pl. iii, figs. 7, 8).

Length ♂ ♀ 13 mm. ♂.—Face yellowish; frontal triangle, a wide medial line, cheeks and oral margins black, with yellow pile; black of the frontal triangle extending slightly downward along the facial orbits; occiput narrowly margined with yellow. Antennæ black; first joint noticeable shorter than in most of the species. Thorax black, with long yellow pile; scutellum and spines yellow, base black. Abdomen black; a small lateral quadrate spot on the first, triangular markings on the second and third laterally connected; a transverse spot on the lateral posterior margin of the fourth, and the posterior half of the

fifth yellow; venter greenish yellow; base of the fourth and fifth segments narrowly marked with brownish black. Legs reddish; coxæ and a wide preapical band on the femora black. Wings hyaline, veins yellow.

♀.—Face, front and occiput yellow, shining; vertex, a transverse marking in the fovea above the base of the antennæ, and oral margin, brown. Thorax with short golden tomentum; pleuræ, posterior angles and the base of the scutellum, brownish; in one specimen the entire scutellum is reddish, but this is evidently a discoloration. The markings on the lateral posterior margin of the fourth segment are subtriangular, and almost connected at the posterior margin; on the fifth there is only a narrow anterior margin of black; all the abdominal markings are widely connected at the lateral margin; venter wholly greenish yellow. Legs of a uniform reddish color; coxæ brownish black.

Three specimens, Custer, S. D. (Univ. Nebraska).

Stratiomyia laticeps Loew (Pl. iii, fig. 9).

Stratiomyia laticeps Loew, Centur. vii, 20.

? Stratiomys nympha Walker, List, iii, etc., 530.

Length ♂ ♀ 11–12 mm. ♂.—Face and frontal triangle black, with white pile; facial and occipital orbits yellow. Antennæ black and noticeably shorter in this species than in any of the others. Thorax black, clothed with a thick, yellowish white pile; scutellum and spines yellow, base black. Abdomen black, marked at the posterior angles of the second, third and fourth segments by a subtriangular spot of yellow, those on the fourth narrowly connected; fifth with a narrow lateral margin and a central posterior triangle of yellow; ventral segments yellow, with a basal band of black, interrupted on the second and third; the third also having two small brown central spots. Femora black, tips of the femora, the tibiæ and tarsi, yellow; tibiæ with a medial band of brown. Wings hyaline, veins red.

♀.—Face, front and occiput yellow, shining; pile white; vertex, a spot above the base of the antennæ, medial facial line and oral margins black. Legs in one specimen totally yellow; femora slightly darker. The black band on the third ventral segment continuous in one and interrupted in the other; lateral marking on the fourth segment not connected.

Two specimens (♂ ♀), Montana (Coquillett); one ♀, Utah (Aldrich); Ogden, Utah, June 20 (collection C. V. Riley, U. S. Nat. Mus.); Reno, Nevada (Wickham).

The type of *S. laticeps* is somewhat larger (14 mm.). The following notes are from specimens in the Museum of Comp. Zoology:

♀.—Femora varying from reddish brown to black; ♂—the posterior margin of the fourth segment narrowly interrupted, and the base of the scutellum widely black. Weber Lake, Cal., July 22 (Osten Sacken); The Dalles Oreg. June 23, Yakina River, Ellensburg, Wash., July 8 (Dr. Hagen); Twin Lake, Col. (Osten Sacken). The later Baron Osten Sacken referred to *S. nymphis* Walker. That this is Walker's species seems quite evident, but a study of the type is necessary.

Stratiomyia normula Loew (Pl. iii, fig. 16).

Stratiomyia normula Loew, Centur. vi, 5.
Stratiomyia quadrigemina Loew, Centur. vi, 4.
Stratiomyia notata Loew, Centur. vi, 18.

Length ♂ ♀ 11–12 mm. ♂.—Face black, shining, with whitish pile. Antennæ black. Thorax black, with long yellowish pile, thickest on the pleuræ; basal half of the scutellum black, apical half and spines yellow. Abdomen black, with the following markings of yellow: second segment with a large lateral triangle, third with a narrow lateral margin (widest at the anterior angle) and a transverse marking at the lateral posterior angle, fourth similar, except that the lateral and lateral posterior margin is usually narrowly interrupted, it also has a small dorsal triangle at the posterior margin, fifth with a narrow lateral margin (obsolete posteriorly) and a central dorsal line; venter black; segments with a lateral and posterior margin of yellow. Femora black; tips of the femora, tibiæ and tarsi, yellow; tibiæ with a medial band of brown. Wings brownish, hyaline, veins red.

♀.—Face black, whitish pile; facial orbits and a subcordate spot below the ocelli yellow; lower part of the occiput yellowish; yellow of the scutellum more prominent. Abdominal markings similar, except that the lateral and lateral posterior margin is usually interrupted on the third, and the lateral posterior marking on the fourth are less prominent, and in some specimens almost wanting. Femora and outer two-thirds of the tibiæ black; the posterior tibiæ and terminal joints of tarsi brownish; tips of the femora, basal portion of the tibiæ and the first two joints of the tarsi, reddish; the color of the tibiæ and tarsi are somewhat variable.

Var. *quadrigemina* Loew (♂).—This is a color variation in which the markings on the third segment are the same as those on the second, that is, a large lateral posterior triangle. I have in my collection a specimen that is intermediate between this and the typical *S. normula*. A specimen in the Museum Comp. Zool. marked, "a *quadrigemina*, *norma* or *normuli*, differs in the flavo-bimaculata," is another of these intermediate forms. The male of *S. normula* is similar to that of *S. norma*, but the latter may be distinguished by the greater amount of yellow on the scutellum; the presence (usually) of a small dorsal triangle on the third, and more hirsute abdomen.

Var. *notata* Loew.—In this variety there is a transverse marking at the lateral posterior margins of both the second and third segments. There is also proportionately less yellow on the lateral margins, but with upwards of twenty specimens before me I can readily connect it with the typical *S. normula*. The two forms were taken on the same day by Mr. Wm. Brodie.

Toronto, Ontario, July 8, 12 and 17 (Wm. Brodie); New York (Osten Sacken); AgriculturalCollege, Michigan (Davis); Algonquin, Ill., June 2 (Dr. Nason); Brookings, S. D. (Aldrich); War Bonnet Canyon, Neb. (Univ. Neb.).

Stratiomyia norma Wiedemann (Pl. iii, figs. 17, 18).

Stratiomys norma Wied., Auss. Zw. ii, 62, 3.

Length ♂ ♀ 12–13 mm. ♀.—Face, lower part of the front, frontal and vertical orbits, ocelli and upper part of the occiput black, with yellowish pile; facial orbits, a large spot on the front and vertex extending on each side of the ocelli over the vertical angle and the lower part of the occiput yellow. Antennæ black. Thorax black, with yellow and brownish tomentum; scutellum yellow, base black; spines red. Abdomen black, with yellowish and blackish pile, and the following yellow, or greenish yellow markings; a prominent triangle at the posterior angle of the second segment, third with a small triangle at the anterior angle, a transverse marking at the lateral posterior margin, and a small dorsal triangle at the posterior margin; fourth with a lateral margin widest anteriorly, a transverse marking on the lateral posterior margin, and a prominent dorsal triangle at the posterior margin; fifth with a narrow lateral margin, and a dorsal vitta widest anteriorly; venter black; second segment yellow, with two elongate spots along the anterior margin; third, fourth and fifth with a narrow lateral and posterior margin of yellow. Femora red, with a wide preapical band of brownish black; tips of femora and the basal half of the tibiæ yellow, outer half of the tibiæ and tarsi red. Wings brownish, hyaline; veins red.

♂.—Face wholly black; the small dorsal triangle on the third segment and the greater amount of yellow on the scutellum distinguishes it from *S. normula*. Femora brownish black; in some specimens showing a preapical band of black on the middle and posterior femora, tibiæ and tarsi reddish yellow.

Philadelphia, Pa.; Agricultural College, Mich., June 20 (Davis); Elkhart, Ind. (J. R. Weith); Algonquin, Ill., June 1 (Dr. Nason); Burlington, Iowa (Dr. H. G. Griffith); Sand Hills, Neb., July (Univ. Neb.); Allegheny, Pa. (Aldrich).

Stratiomyia unilimbata Loew (Pl. iii, figs. 19, 20).

Stratiomyia unilimbata Loew, Centur. vi, 6.

Length ♂ ♀ 13 mm. ♂.—Face, frontal and vertical triangle black; face with long white pile. Antennæ black, under side of the third joint brownish. Thorax black, with a whitish pile, which is longest on the pleuræ; scutellum and spines yellow, base black. Abdomen black, with the following yellow markings on the segments: second with a large lateral triangle; third with a small subtriangular spot at the anterior angles, a transverse marking at the lateral posterior margin, and a very small dorsal triangle at the posterior margin; fourth with lateral and posterior margins, the latter with a small dorsal projection; fifth with a slight lateral margin towards the anterior angles, and a subtriangular dorsal mark not reaching anterior margin; venter black, segments with yellow posterior margins, widest on the second segment, where the black is widely interrupted. Femora black, tips of the femora, basal half of the tibiæ and the tarsi, yellow; outer half of the tibiæ, the last two and tips of the other tarsal joints blackish; the outer half of the posterior tibiæ is normally brownish, with a medial ring of black. Wings brownish hyaline; veins reddish.

♀.—Face, front, vertex and occiput black; pile on the face whitish, thickest along the orbits; front with a small, yellow, subcordate spot below the ocelli; lower part of the occiput, an obscure greenish yellow. Thorax black, with short

yellowish white tomentum; scutellum yellow, the black base narrower than in the male. Abdominal markings the same as the male, except that markings on the second segment are usually contiguous at the posterior angles.

In a male specimen in the U. S. National Museum the marking on the posterior margins of the third segment are contiguous, forming a margin similar to that on the fourth. A female from Illinois has the markings on the posterior margin of the third contiguous and widely interrupted on the fourth.

Montana (Morrison, Univ. Kans.); Wisconsin (Loew); Brookings, S. D. (Aldrich); Custer, S. D.; War Bonnet Canyon; Lincoln, August; and West Pt., Neb. (Univ. Neb.); Cheyenne, Wyoming, June 15 (collection C. V. Riley); Spanish Peak, Col. (Osten Sacken), Mus. Comp. Zool.; Carlinville, Ill. (Robertson).

Stratiomyia senaria Loew (Pl. iii, fig. 10).

Stratiomyia senaria Loew, Centur. vi, 7.

Length 11 mm.; wing 9 mm. ♀.—Face, front and upper part of the occiput black, with whitish tomentum; a yellow spot below the ocelli, facial orbits and lower part of the occiput, dull yellow. Antennæ black. Thorax black, with yellowish white tomentum; scutellum yellow, with a narrow black base, spines red. Abdomen black; second, third and fourth segments with transverse yellow markings along the lateral posterior margins, those on the fourth short and narrow, third with a small yellow spot at the anterior angles; fourth laterally margined with yellow; fifth with a narrow lateral margin and a central stripe not reaching the anterior margin; one specimen shows a short, obsolete, central stripe on the fourth; venter black, second segment broadly margined with yellow, or yellow with black maculations on the lateral anterior margins; third, fourth and fifth with a narrow posterior margin of yellow. Femora black, tips of the femora, tibiæ and tarsi yellow; in one specimen the anterior and middle tibiæ are annulated with brown in the middle, and the outer half of the posterior tibiæ is brown. Wings of a uniform dark brown.

Two specimens, St. Augustine, Fla.

In the type, a ♂, the markings on the second segment are somewhat triangular, and those on the third and fourth nearly of equal size.

Stratiomyia nevadæ Bigot.

Stratiomys nevadæ Bigot, Ann. Soc. Ent. France, xxxviii, 24.

Long. 10 mill. ♀.—Nigra, facie, thorace scutelloque longe et dense cinereo villosis; abdomen nigro piloso; halteribus fuscanis, clava prasina; spinis scutelli pallide testaceis, apice fuscis; tibiis basi, late fere albis, tarsis fulvo notatis, apice infuscatis; alis pallidissime flavis, macula stigmaticali pallide castanea.

Entièrement noire, excepté: cotés de la face, thorax, écusson, longuement et assez densément couverts de poils gris; abdomen avec des poils noirs et courts; épines de l'écusson blanchatres, a pointe brune; balanciers roussatres avec la massue d'un vert c'air; base des tibias largement blanchatre, tarses roussatres avec, l'extrémité brunatre; ailes un peu roussatres ainsi que le stigmate.

Amer. Septentr. (Nevada); one specimen.

The following description I refer to this species, a study of the type is necessary for certainty:

Length ♂ 11 mm.—Face black, with long, dense, whitish pubescence. Antennæ black. Thorax and scutellum black, with long whitish pile; spines of the scutellum yellow; halteres bright green. Abdomen black, shining; pile black; venter black, segments with a narrow posterior margin of yellow. Legs black; tips of the femora, basal half of the tibiæ and two basal joints of the tarsi, yellow; the remaining joints of the tarsi brownish. Wings hyaline, veins brown.

Two specimens, Weber Lake, California, July 25 (Osten Sacken), Museum of Comparative Zoology, Cambridge, Mass.

This species may be readily known by its uniform black color, and conspicuous whitish pile. This species is included by Baron Osten Sacken in the following remark in Western Diptera, p. 213: "I have furthermore three Stratiomyiæ and one Odontomyiæ from the Sierra Nevada (Weber Lake, in July) which I abstain from describing."

Stratiomyia Meigenii Wiedemann (Pl. iii, figs. 21, 22).

Stratiomys Meigenii Wied., Auss. Zw. ii, 61, 2 (tab. viii, fig. 7).
? Stratiomys lineolata Macquart, Dipt. Exot. 4e Suppl. 48, 6 (tab. iii, fig. 5).
Stratiomyia angularis Loew, Centur. vi, 16.
Stratiomyia marginalis Loew, Centur. vi, 17.

Length ♂ ♀ 11 13 mm. ♂.—Face black, with whitish pile. Antennæ black. Thorax black, whitish pile, longest and thickest on the pleura; scutellum black, apical margin (between the spines) greenish yellow, spines dark yellow, the tips more or less brownish, the size of the apical margin varies from a narrow line to an area about one-fifth the size of the scutellum. Abdomen black, with short black and whitish pubescence, and marked with yellow as follows: second segment with triangular lateral markings narrowly reaching the anterior angles; in some specimens these markings are truncated or divided anteriorly, leaving subtriangular or oblong transverse markings at the posterior angles, and very small markings on the anterior angles; lateral margins of the third segment expanding into triangles at the anterior angles, and connected at the posterior angles with the transverse markings on the lateral posterior margins; markings on the fourth the same as those on the third, except that the transverse markings are much shorter and narrower; the form of the lateral margins varies, in one specimen the lateral and transverse markings on the third and fourth segments are of uniform width; fifth with lateral margins and an even dorsal line not reaching the anterior margin; venter yellow or greenish yellow; second segment with an oblong black spot on each side along the anterior margin, sometimes narrowly connected; third, fourth and fifth with a transverse central spot, usually attenuated along the anterior margin, but not reaching the lateral edge; the maculations vary considerably, and in one specimen are almost obsolete. Femora black, outer two-thirds of the anterior and middle tibiæ black or brownish black, posterior tibiæ reddish, annulated in the middle with brown; in some specimens this

character also prevails on the middle tibiæ; tips of the femora, base of the tibiæ and tarsi yellow, tarsal joints annulated with red at the tips. Wings brown, veins red, tips more or less a clear hyaline.

♀.—Face, front and vertex black, whitish pile longest and thickest on the face, front shining, a spot on the facial orbits, a small subcordate spot below the ocelli and the lower part of the occiput yellow; in some specimens there is also a very small spot on each side of the ocelli. Thorax black, with black and whitish tomentum, arranged so as to form a broad dorsal and transverse line and a postalar spot of black. Abdomen black, with short whitish pubescence; the yellow markings on the second, third and fourth segments consists of a small subtriangular at the anterior angles, a narrow lateral margin more or less distinct, and narrow transverse markings at the lateral posterior margin, fifth with a lateral margin widest anteriorly, and a dorsal stripe not reaching the anterior margin; venter greenish yellow, with black markings similar to those of the male, but usually larger, leaving only a narrow lateral and posterior margin of yellow.

Over forty specimens; southeastern Pennsylvania and southern New Jersey; common July 5 to August 16; West Pt., Neb., June (Aldrich); Riley County, Kansas, June (Marlatt); Blanco County, Texas; Agricultural College, Michigan, June 20 (Davis); Algonquin, Ill., June 4 (Dr. Nason).

Loew's descriptions were based on single specimens; with a large series it would have been impossible to separate them. The type of *S. angularis* differs from *S. marginalis* in having more prominent yellow triangles at the anterior angles of the segments, and *S. nigriventris* in having a greater amount of black on the ventral segments. The specimen referred to, *S. Meigenii*, has the yellow spot on the front, and the yellow of the scutellum prominent. Wiedemann describes a ♂, but the head in the figure is that of a ♀. In the figure the abdomen shows only four segments, or at least the color markings indicate only four, while the vittæ on the fifth segment extends from the anterior margin and does not reach the posterior; the latter is the reverse in all our *Stratiomyia*, so that the figure should be considered incorrect.

Stratiomyia apicula Loew, (Pl. iii, figs. 23, 24).

Stratiomyia apicula Loew, Centur. vi, 13.

Length ♂ ♀ 12 mm. ♂.—Face, frontal and vertical triangles black; pile on the face white; facial orbits slightly yellowish. Antennæ black, underside of the third and tip of the second joint brown. Thorax black, with yellowish white pile; scutellum black, apical margin and spines yellow. Abdomen black, with short whitish pubescence, and with the following yellow marking on each of the segments: a small lateral spot on the first, a large subquadrate marking at the sides of the second; third with a wide lateral posterior margin of about equal extent; fourth with a lateral margin, widest anteriorly and slightly extending

onto the lateral posterior margin; fifth with narrow lateral margins, and a central triangle attenuated anteriorly, but not quite reaching the anterior margin; venter black; segments with yellow posterior margins, widest on the second segment, where the black consists of two large spots along the anterior margin. Femora black, outer half of the anterior and middle, and a medial band on the posterior tibiæ brownish black; tip of the femora, basal half of the anterior and middle tibiæ, posterior tibiæ and all the tarsi yellowish. Wings brown, hyaline; veins reddish.

♀.—Face, front, vertex and upper portion of the occiput, black; face with whitish tomentum; facial orbits, a small subcordate spot below the ocelli, and the lower portions of the occiput, greenish yellow. Thorax black, with yellowish tomentum; scutellum black; apical margin and species yellow. Abdominal markings the same as the male, except that the markings on the side of the second segment are more quadrate.

Burlington, Iowa (Dr. H. G. Griffith); Algonquin, Ill., June 8–19 (Dr. Nason); Douglas County, Kansas, June (Univ. Kans.); War Bonnet Canyon and Lincoln, Neb. (Univ. Neb.).

Stratiomyia discalis Loew (Pl. iii, figs. 27, 28).

Stratiomyia discalis Loew, Centur. vi, 14.

Length ♂ ♀ 14 mm. ♂.—Face, frontal and vertical triangle black; pile long, yellowish. Antennæ black. Thorax black, with long, dense, yellowish pile; scutellum black, with long pile; apical margin and spine yellow. Abdomen black, shining; thick and very convex; pile on the first, second and fifth segments yellowish; on the third and fourth black; a small spot at the posterior angles of the first, a large quadrate marking on the sides of the second; a triangular mark at the anterior angles of the third, and a dorsal line on the fifth, yellow; first, fourth and fifth ventral segments black, with narrow lateral and posterior margins; second and third yellow, with a narrow posterior margin of black on the second, and two black spots on the posterior margin of the third; pile on the entire ventral surface yellow. Femora and tibiæ black, or brownish black; tip of the femora, basal third of the tibiæ, yellowish; basal half of the posterior femora and the tarsi brownish. Wings brown, hyaline.

♀.—Face, front, vertex and occiput black; face with thick yellowish pubescence, sparse on the front and vertex; facial orbits and a small cordate spot below the ocelli yellow. Antennæ black, proboscis brownish. Thorax black, with a dense yellowish tomentum; scutellum black, apex and spines yellow. Abdomen black, shining, with a very short whitish pubescence; a subtriangular mark on the sides of the second, a small triangular mark at the anterior angle of the third, a very narrow lateral margin on the fourth and fifth, and a dorsal line on the fifth, yellow; venter same as the male; posterior tibiæ, tarsi (except the tips) and basal half of the femora, yellow.

Provo, Utah (Wickham); West Point, Neb., May (Aldrich); Minnesota (Univ. Kans.); Algonquin, Ill. (Dr. Nason); Pennsylvania (Philip Nell); Agricultural College, Michigan (Lowe); West Virginia and Massachusetts, June (Riley); Spanish Peak, Col. (Museum Comparative Zoology).

Stratiomyia quaternaria Loew (Pl. iii, figs. 25, 26).

Stratiomyia quaternaria Loew, Centur. vi, 12.

Length ♂ ♀ 11 mm.; wing 9 mm. ♂.—Face black, whitish pile. Antennæ black, brownish on the underside of the third joint. Thorax black, with long, brown, reddish pile, not quite as wide as the head; scutellum black; apical margin and spines yellow. Abdomen black, with black and yellowish pile, and marked with yellow as follows: a large, square, lateral marking on the second; a large lateral marking on the third, nearly as wide as that on the second, but not touching the anterior margin its full width, and with an indentation on the inner edge near the posterior margin; fourth with a lateral margin widest anteriorly, or with a small triangle at the anterior angles; fifth with a very narrow or obsolete lateral margin, and a medial line not reaching the anterior margin; venter yellow, second segment with two elongated black spots along the anterior margin, midway between the centre and lateral margin; third with a central black square of greater or less extent, sometimes consisting only of an anterior marginal line; fourth black, with a wide lateral and narrow posterior margin (in one specimen a narrow medial line); fifth black, with a narrow lateral and posterior margin. Abdomen wider than the female, sides of the second, third and fourth almost parallel. Femora black, tip of the femora, base of the tibiæ and posterior tarsi yellow; outer half of the anterior and middle tibiæ dark brown, posterior tibiæ annulated with brown in the middle; tarsi reddish brown. Wings brown, hyaline; veins red, discal cell emits three veins.

♀.—Face, front and vertex black; whitish pile, a small spot below the ocelli, and one on each side of the face yellow; the yellow markings on the second abdominal segment the same as in the male; on the third segment the same as the male, or much smaller, and consisting of a subtriangular spot at the anterior angle and a narrow margin at the posterior angle; the form of the yellow markings on the third segment is the most variable character.

Allegheny, June 7, and Northumberland County, Pennsylvania (Aldrich); Agricultural College, Michigan, June 16 (Davis); Algonquin, Ill., June 4 (Dr. Nason); Denver, Col. (Beales).

Stratiomyia maculosa Loew (Pl. iii, figs. 13, 14, 15).

Stratiomyia maculosa Loew, Centur. vii, 19, ♀.

Stratiomyia insignis Loew, Centur. x, 7, ♂.

Stratiomys dentata Bigot, ♀ Ann. Soc. Ent. France, xvi, 1879, 210.

Stratiomys lacerata Bigot, ♂ Ann. Soc. Ent. France, xvi, 1879, 211.

Length ♂ ♀ 14 mm. ♂.—Face black, with yellowish white pile; occiput narrowly margined with yellow. Antennæ black. Thorax black, with long, dense, yellow pile; scutellum yellow, base black. Abdomen black, with yellow pubescence, and marked with yellow as follows: the large lateral spots do not reach the anterior margin, except near the angles; second segment with a large subtriangular lateral spot; third with a large, square, lateral spot, which contains, near the lateral margin, a small, oblique, black spot; in one specimen this spot is wanting, and there is a small dorsal triangle at the posterior margin; in this specimen the square markings on the fourth segment contain a small oblique black spot, and the yellow on the posterior margin is continuous. In the first specimen (fourth segment) the spot is connected with the black, thus forming an incisure into the square, yellow, lateral spot; yellow not continuous on the pos

terior margin, and only a small dorsal triangle; fifth with a lateral margin, widest anteriorly, and a dorsal line. In specimen referred to there is a round spot on each side of the dorsal line; venter yellow, with a central row of large black maculations; laterally attenuated along the anterior margin, but not reaching the lateral or posterior edges; in some specimens the black on the second segment consists only of an irregular line; the ventral markings are quite constant in both sexes.

♀.—Face, front and occiput, yellow; oral margin, cheeks and medial facial line (more or less distinct) a transverse line from the base of the antennæ to the eyes and the vertex, black; in some specimens the two latter are narrowly connected at the sides; vertical angle with two yellow spots, sometimes connected on the cervex. Thorax black, with yellowish tomentum; scutellum wholly yellow. Abdomen black; the variable yellow markings might be described from three specimens, as follows: *First.*—The square lateral markings on the second segment with a small lateral spot of black; the square lateral markings on the third and fourth with a broad oblique incisure of black; a small triangle on the posterior margin of the second, a larger one on the third, and the one on the fourth much larger and greatly attenuated, but not reaching the anterior margin; the yellow markings not connected at the posterior margin; fifth with a dorsal line, on the sides of which are spots narrowly connected, but not connected with the lateral margins. *Second.*—The square lateral markings on the second segment without the small black spots; lateral markings on the third and fourth with oblique black spots; second segment with a small dorsal triangle, third with a larger triangle; fourth with a much larger and attenuated triangle, not reaching the anterior margin, the yellow markings connected at the posterior margin; fifth with a dorsal line, on each side of which is a spot narrowly connected with the dorsal line and lateral margin. *Third.*—The square lateral markings on the second segment with small black spots and a prominent dorsal triangle; lateral squares on the third with black spots and a larger dorsal triangle; fourth segment yellow, except a narrow anterior margin, the lateral spots and two minute points on the posterior margin of black; the markings on the fifth segment might be described as a broad dorsal line, with a spot on each side broadly connected with the dorsal line and lateral margins, or yellow, with a narrow anterior margin, and subtriangular markings at the posterior angles, of black. Femora black; tips of the femora, tibiæ and tarsi, reddish yellow; middle of the tibiæ obscurely annulated with brown, most prominent on the posterior tibiæ. Wings brownish, veins dark yellow.

Alameda County, California (Coquillett); San Rafael County, California, April and May (Osten Sacken); Ogden, Utah (Riley), U. S. National Museum.

The above description is based on four males and four females. The great variation in color is remarkable, in comparison with other North American species. The black face and base of scutellum of the male led Loew to describe it as another species. Baron Osten Sacken, in Western Diptera, p. 213, refers to the two species *S. maculosa* and *S. insignis* as being identical.

Stratiomyia badius Walker (Pl. iii, figs. 11, 12).

Stratiomys Badius Walker, List, iii, 529, l. c. iv, 1157.

Stratiomys ischiaca (Harris), Walker, List, iii, 529.

Stratiomyia picipes Loew, Centur. vii, 21.

Length ♂ ♀ 14 mm. ♂.—Face and lower portion of the occiput yellow; face with long yellow pile; a wide facial line, mouth, vertical triangle and upper part of the occiput black. Antennæ black. Thorax black, with brownish pile; scutellum yellow, base black; apical margin and spines red. Abdomen marked with yellow, as follows: second segment with a small spot at the anterior angles, and a transverse marking on the lateral posterior margins; those on the third segment similar, except that the markings on the lateral posterior angles are longer, and in some specimens almost join; fourth with a spot at the anterior angle, and a continuous posterior margin, from which extends, anteriorly (for about two-thirds the length of the segment), a medial stripe widest at the base; the fifth with a very narrow lateral margin and a medial stripe not reaching the anterior margin; venter black, with lateral spots on the first and a quite uniform posterior margin of yellow to all the other segments. Femora black, varied with brown; basal third of the tibiæ yellow; tips of the femora, tibiæ and tarsi, red. Wings brownish, hyaline; veins reddish.

♀.—Vertical portions of the occiput, vertex, front, facial line and mouth black. Face, two large spots on the front, two on the vertical angles and lower part of the occiput yellow; pile on the thorax shorter than in the ♂ and with somewhat conspicuous whitish tufts at the humeri, suture, posterior angles and pleuræ: yellow of the scutellum more prominent. Femora red, with a wide, variable band of brownish black.

Franconia and Mt. Washington, N. H. (Mrs. Slosson); Massachusetts (Harris); "English River, Kennicot; Canada, Couper" (Loew).

Walker's name having priority, I have adopted instead of Loew's. In describing the species Walker gave the habitat as "New Holland." This he corrects in List, pt. iv, p. 1157, as follows: "for New Holland *read* New Hampshire, and unite the description of *S. Badius* with that of *S. ischiaca*." The latter name first appeared in "Harris' Catalogue Insects of Massachusetts," 1835 (name only).

Stratiomyia mutabilis Fabricius (Pl. iv, fig. 3).

Stratiomys mutabilis Fabr., Ent. Syst. iv, 262; Syst. Antl., 81; Wiedemann, Auss. Zw. ii, 63, tab. 8, figs. *a-d*; Perty, Del. Anim., etc., tab. 38, 14; Bellardi, Saggio, etc., i, 30; Schiner, Novara, etc., 61.

Stratiomys fasciata Fabr., Ent. Syst. iv, 266; Syst. Antl. 81, [Bellardi].

Length ♂ ♀ 9 mm.—Face black, with white pile, which is very long and thick on the inferior orbits; facial prominence shining; facial orbits, and a spot on each side of the prominence near the base of the antennæ, yellow. Antennæ black, basal half of the first joint reddish. Thorax black, with thick whitish pile; posterior angles yellow; scutellum black, inferior margin, basal angles and spines, yellow; tips black. Abdomen black, with a dense pubescence, which, in certain lights, show a silvery reflection (more noticeable on the ventral surface), segments narrowly margined with yellow; a band occupying the posterior two-

thirds of the fourth, and one occupying the medial third of the fifth segment yellow; venter yellow; all the segments with a basal band of black, the first segment also has a posterior band. Femora brownish black; tibiæ and tarsi reddish, terminal half of the tarsi brownish; anterior half of the wings yellowish, the outer portion of this with a brownish tinge.

♀.—Face and front black, with yellowish white pile; facial and frontal orbits, two spots above, and two below the base of the antennæ and occiput, yellow. Thorax black, pubescence yellow; humeri, a narrow, raised, lateral line that divides the dorsum from the pleuræ, and the posterior angles yellow; scutellum and spines yellow, discal portion of the scutellum and tips of spines, brown.

Orizaba, Mex. (Prof. Bruner); Tehuantepec (collection C. V. Riley, U. S. National Museum); Panama (Mus. Comp. Zool.); San Geronimo, Guatemala (Champion); 6000 to 7000 feet Irazu Costa Rica (Rogers); Cayenne; Brazil.

Stratiomyia constans Loew (Pl. iv, figs. 1, 2).

Stratiomyia constans Loew, Centur. x, 8.

Length ♂ ♀ 9 mm.; wings 7 mm. ♂.—Face black, with silvery white pile; a small spot on each side of the facial protruberance, a spot on the orbits and the lower part of the occiput yellow; oral margin more or less brownish; proboscis black, base brown, first and second joints of the antennæ red, tips of the first and the third joints black. Thorax black, whitish pubescence; pleuræ and pectus with silvery white pile; humeri, a spot forward of the suture and the posterior angle, yellow; pleuræ with an irregular spot on the prothorax, a smaller one on the mesothorax and metathorax, yellow; scutellum yellow; spines red. Abdomen black, with whitish pubescence (silvery in certain lights), and marked with yellow, as follows: second segment with subtriangular markings at the lateral posterior angle; third with a wide posterior band (in one specimen narrowly interrupted); fourth with a narrow posterior band (which is broadly interrupted in one specimen); all the segments with a narrow lateral margin; venter greenish yellow, with silvery white pubescence; first segment with two spots and a narrow posterior margin of black; second, third, fourth and fifth, with an anterior band of black, laterally attenuated, but not quite reaching the lateral margin; the band on the second segment is usually interrupted. Legs uniform red; anterior third of the wing dark brown; veins reddish, the remainder of the wing brownish hyaline.

♀.—Face, front, vertex and occiput yellow; with yellowish pubescence; oral margin and a line extending from there to the orbits brownish black; base of the antennæ surrounded by black, from which extends a central line to the facial prominence, and one on each side midway between the facial line and the orbits; narrowly connected above with the square black marking on the front and vertex; vertical orbits brownish, and connected with the black of the vertex. Thorax black; humeri, a lateral stripe extending to the suture; posterior angle, scutellum and pleuræ, yellow; the lateral stripe and pleuræ narrowly divided by a prominent dorso-pleural suture; the posterior margin of the third and fourth segments continuous; prominent and of uniform width.

Blanco County, Texas.

Stratiomyia Gerstaeckeri Bellardi.

Stratiomys Gerstaeckeri Bellardi, Saggio, etc., i, 31, tab. 1, fig. 10.

♂.—Black, with greenish stripes. Head broad, eyes naked and contiguous near base of front, ocelli yellow, front triangular, black, with yellowish pubescence. Antennæ long, black, base of the first yellowish, face very prominent, black shining; pubescence whitish, with two yellow spots near the orbits, the upper one near the base of the antennæ the lower one on the inferior orbits; apex of the epistoma marked with yellow; palpi yellow, proboscis black. Thorax subquadrate, black, pubescence yellow, posterior with two greenish markings; pleuræ and pectus with whitish pile; scutellum black, spines yellow, halteres green, base brown. Abdomen subquadrate, depressed, black, somewhat naked, pile yellow, obsolete, margins greenish yellow, second and third with a band at the posterior margin band small and not interrupted; venter green tomentose, silvery. Legs brownish black; femora very black, tibiæ and tarsi obscure yellow; apex of the tarsi brown. Wing, anterior margin broadly, densely fuscous, posterior margin hyaline. Length 7 mm.; wings 18 mm.

Mexico (Sallé), Bellardi.

This species, on first appearance, seems related to *Stratiomyia subalba* Walker, but the bands on the second and third segments are not interrupted.

Stratiomyia bimaculata Bellardi.

Stratiomys bimaculata Bellardi, Saggio, etc., App. 10, fig. 7.

♂.—Black, with two whitish spots. Head broad, eyes near the base of the front contiguous; front small, triangular, black, below with yellowish silvery pubescence, above with black pubescence. Antennæ very long, black; base of the first joint yellowish, face prominent, middle longitudinally carinate, black, shining with thin whitish pubescence; palpi brown, near apex yellow, proboscis black. Thorax subquadrate, slightly convex, black; tomentose somewhat dense and yellowish brown, a green spot between the base of the wing and scutellum; scutellum black, spines short, black, and near the apex, yellowish; pleuræ and pectus black, with whitish pubescence; halteres green, near the base yellow. Abdomen subquadrate, depressed, black, tomentose brown; second segment with two large, greenish white spots, contiguous with the posterior margins of the segments and curved anteriorly, middle stripe small; venter white, silvery tomentose. Legs brownish black, all of the femora black; tibiæ and tarsi reddish yellow. Wings small, rather long, anterior broadly stained with black, near the posterior margin clouded. Length 11 mm.; wings 20 mm.

Cosamaloapam, Mexico (Sallé), Bellardi.

Doubtful and Undetermined Species.

Stratiomyia constricta Walker.

Stratiomys constricta Walker, Trans. Ent. Soc. n. ser. v, 268.

♂.—Deep black. Head with slightly silvery tomentum in front and with gray pubescence beneath and behind; scutellum with two piceous spines. Abdomen piceous at the tip, and with a band of slightly silvery tomentum on each segment; tarsi and hind tibiæ tawny. Wing lurid at base, dark brown from thence to more than half the length, vitreous and colorless toward the tip. Length 6 lin.; wings 12 lin.

Mexico.

Stratiomyia pinguis Walker.

Stratiomys pinguis Walker, Trans. Ent. Soc. n. ser. v, 270.

♀.—Blackish. Head with ferruginous tomentum above with whitish pubescence in front; hind side with silvery tomentum. Antennæ black; third joint lanceolate towards the tip, much longer than the first. Thorax with ferruginous tomentum and with ferruginous stripe along each side; scutellum with two ferruginous spines. Abdomen with bands of slightly gilded tomentum on the borders of each segment; underside with bands of whitish tomentum, which are dilated on each side, and with a broad, tawny, discal stripe. Femora and tibiæ beneath and tarsi, tawny. Wings vitreous, lurid along the costal from the base to nearly two-thirds its length. Length 6 lin.; wing 12 lin.

Mexico.

Stratiomyia subalba Walker.

Stratiomys subalba Walker, List, etc., v, 43.

? Stratiomys subalba Bellardi, Saggio, etc., i, 31; Osten Sacken, Biol. Cent.-Amer. Dipt. 36.

"Male.—Black, clothed beneath with silvery down. Antennæ nearly twice the length of the head; first joint tawny towards the base, nearly six times the length of the second; flagellum elongate-fusiform; scutellum tawny along the hind border, with two testaceous spines. Abdomen with two interrupted whitish bands, one on the second, the other on the third segment; underside pale green, with silvery tomentum. Legs tawny; femora black. Wings limpid, narrow, dark brown in front; halteres white. Length of body 3 lines; wing 6 lines.

"Para. From Mr. Bates' collection (Walker)."

"Male.—Black, vittæ white. Head broad, eyes near the base of the front contiguous; front small, triangular, black, with yellow pile. Antennæ long, black; first joint yellow, near the apex black; face prominent, carinate, black, shining, with sparse white pile; palpis flavis; proboscis black. Thorax subquadrate, black, tomentum rather long, yellow, a pale spot between the base of the scutellum and base of the wing; scutellum black, bispinose; spines yellow, short; pleuræ and pectus black, with white pile; halteres yellow, knob green. Abdomen subquadrate, black; second and third vittæ near the posterior margin; vittæ rather broad, interrupted in the middle, white; lateral margin of the second, third and fourth segments yellowish; venter yellow, with silvery tomentum. Legs black and yellow; femora black; tibiæ and tarsi yellow. Wings yellowish, towards the posterior margin broadly hyaline, and the anterior margin fuscous. Length 8 mm.; length of wings 16 mm."

Tampico, Mex. (de Saussure). *Bellardi* Baron Osten Sacken (Biol. Centr.-Amer. Dipt. 36) refers to this species as follows:

"I cannot believe that this species is merely a variety of *S. mutabile*, besides the very considerable difference in the coloring of the body and wings (the costal half of which is uniformly brown). The abdomen is squarer and flatter than in the male of that insect. Schiner (Reise d. Novara Dipt. p. 61) speaks of varieties of *S. mutabilis* with the costal half of the wing uniformly brown; and Arri-

balzaga (Catalogue, etc., p. 128) regards *S. subalba* Walker as a mere variety of *S. mutabilis*. But is Schiner right? and is *S. subalba* Arrib. the same as *S. subalba* Bell.? meanwhile I cannot believe, until we have proof of the contrary, that the four male specimens before me are a mere variety of *S. mutabilis*."

I have not seen this species.

Stratiomyia goniphora Say.

Stratiomys goniphora Say, Jour. Acad. Nat. Sci. Phila., vi. 161; Compl. Wr. ii, 356.

"Black. Thorax with minute golden hairs; beneath greenish. Head yellowish white, two undulated, black, frontal bands; vertex black, yellowish behind; hypostoma with a lateral black dot, sometimes obsolete; proboscis black. Antennæ black, occiput black. Thorax with numerous small golden hairs; a yellowish line over the wings; scutel black, posterior margin and spines yellow. Wings hyaline, costal nervures and cellule yellowish; middle nervures blackish, tergum black, with lateral yellow triangles and tip; beneath pale greenish, pectus on the disc black; feet yellowish, a line between the thighs black; venter on the posterior disc ferruginous (Say). Length more than three-tenths of an inch.

"Inhabits Mexico."

Stratiomyia robusta Walker.

Stratiomys robusta Walker, List, v, 37.

Nigra; oculi testaceo exparte marginati; antennæ capite duplo longiores; scutellum margine postico spinisque flavis; abdomen crassum, marginibus vitta apicali ventreque flavis, hac fascius tribus abbreviatis nigris; pedes flavi, femoribus nigris, tibiis nigro cinctis; alæ fuscæ, apice limpidæ; halteres flavi.

Fem.—Black. Head testaceous about part of the eyes. Antennæ about twice the length of the head; first joint full six times the length of the second. Thorax clothed with pale down; hind border and spines of the scutellum yellow. Abdomen convex, very thick, yellow along the sides, and with a yellow stripe on the apical segment; underside yellow, with three broad, black bands, which are much abbreviated on each side. Legs yellow; femora black; a black band on each tibia. Wings brown, with limpid tips; veins piceous; halteres yellow. Length of the body 5 lines; wings 10 lines.

North America (Walker).

Stratiomyia nigrifrons Walker.

Stratiomys nigrifrons Walker, List, iii, 531.

"Mas.—Nigra; scutelli margine postice flavo, abdominis lateribus maculisque ad apicem duabus flavis, ventris fasciis flavis, antennis pedibusque nigris, tibiis apice tarsu fulvis, alis fuscis.

"Body black. Head as broad as the chest, clothed with tawny hairs; eyes black; a small part on each side composed of very small facets; mouth and feelers black; chest and breast clothed with dark tawny hairs; hind border of the scutcheon yellow, armed with two tawny spines. Abdomen nearly oval, a little broader and longer than the chest, thinly clothed with short tawny hairs, yellow on each side, and adorned with a yellow spot on each of the last two segments;

hind border of each segment on the underside adorned with a yellow stripe, which is widened in the middle. Legs black, clothed with short tawny hairs: shanks tawny towards the base; feet tawny; hind shanks tawny, with two black bands. Wings brown, wing-ribs piceous; veins ferruginous; poisers tawny, with apple-green knobs.

"Fem.—All the facets of the eyes very small; hind border of scutcheon tawny; sides and hind borders of the segments of the abdomen tawny, its upper side also adorned with a short tawny stripe at the tip, and a large tawny spot on each side of the base; feet piceous above; claws black, tawny at the base; knobs of poisers tawny. Length of the body 6-6.5 lines; wings 10-11 lines (Walker).

St. Martin's Falls, Albany River, Hudson's Bay.

Stratiomyia simplex Bigot.

Stratiomys simplex Bigot, Ann. Soc. Ent. France, xxxvii, 24.

"♀. Long. 8 mill.

"Nigra; facie, fronte, thorace, scutello, parce cinereo-flavido villosis et tomento flavido intermixto; spinis scutelli testaceis, apice fuscis; halteribus testaceis, clava prasina; abdomine fere nudo, flavido anguste circumdato, segmentis 2, 3 et 4^{is}, utrinque, apice, vitta flavida, angusta, notatis, ventre prasino flavescente: femoribus nigris, albido tomentosis, tibiis, fusco annulatis, fulvis, tarsis fuscanis, basi late fulvis; alis fere hyalinis, macula stigmaticali fulva, venis fulvo pallido limbatis. Antennarum segmento 1° abbreviato."

"Noire. Face, front, thorax, écusson, couverts d'une villosité gris jaunatre, mélangée d'un fin duvet squammeux également jaunatre, flancs à poils gris; épines de l'écusson testacées, à pointe brune; balanciers testacés, à massue verte; abdomen à peu près nu, finement bordé de fauve, 2e, 3e et 4e segments avec, de chaque coté de l'extrémité une demibande étroite, jaune, ventre d'un jaune verdatre; cuisses noire, à duvet blanchatre, genoux et tibias fauves, ainsi que la base de tous les segments tarsiens, un anneau brun, étroit, sis vers le milieu des tibias Premier segment des antennes relativement court.

"Texas, Colorado, 3 spécim."

ODONTOMYIA.

Odontomyia Meigen Klassific., etc., i, 128, 1804.
Stratiomys in part, of early authors.

Rather large, color variable, green or yellow with black markings, or black, with green and yellow markings. Males and females, as a rule, vary considerably in appearance. Head hemispherical, eyes of the male contiguous, but broadly separated in the female; ocelli prominent, face rounded or somewhat prominent and slightly carinate. Antennæ inserted near the middle of the head, variable; first joint less than three times the length of the second, third longer than the first and second together, more or less tapering, without style or bristle, and composed of five annuli. Thorax subquadrate and pilose in the male, quadrate and tomentose in the female; scutellum prominent, with two spines. Abdomen ovate, flattened, and

but slightly convex, with five visible segments. Legs of moderate size, tibiæ without spurs. Wings clear hyaline, veins yellowish, anterior veins crowded, third longitudinal vein branched in the more typical forms, and from the discal cell emits three equal or unequal veins, sometimes the lower veins that arises from the discal cell (fourth longitudinal vein) is faint or rudimentary, and the third and fourth posterior cells are coalescent, but in such cases the discal cell will usually show an angulation indicating its origin.

Type of the genus *O. ornata* Meigen, of Europe.

In the species placed in this genus there is a greater variation to contend with than in the genus *Stratiomyia*. In the first or leading character, which distinguishes this from the preceding, viz., "first joint of the antennæ less than three times the length of the second;" there is a gradual lengthening of the first joint from less than twice the length of the second until the full limit is reached, as in *O. flavicornis* and *O. occipitalis*. In the latter the third longitudinal vein is simple, but this character is not confined to those with an unusual long first antennal joint, but is characteristic of a number with normal antennæ. Again, in the case of *O. flavicornis* and *O. occipitalis*, which have the same alar and antennal characters; the eyes of the male of the former are pubescent, while the latter are glabrous. Rondani founded the genus *Pselliodotus* on "eyes hairy, type *O. elegans* vel *cruciata* Macq." A male specimen of *O. elegans* before me shows that the first and second joint of the antennæ are subequal, and the third longitudinal vein is branched. In *O. viridis* Bellardi and *O. obscura* Oliv. the eyes of both the male and female are pubescent, third longitudinal vein branched in the former, and in the latter simple.

Another genus to which some of the species have been referred is *Exchostoma* Macq.; type *E. nitida* Macq. of southern Europe. I have been unable to make any of our species agree satisfactorily with this genus. Bigot's *Exchostoma calceps* I have referred to Loew's *O. nigrirostris*. Dr. Williston's says "Bigot's species is in any event an *Odontomyia*."

A universal study of this and allied genera may prove the necessity of placing some of our species in other genera; but until this is done, and we have a better knowledge of the American species, such a course would be unadvisable. Some of my determinations may eventually prove to be in error, but I have honestly endeavored to straighten out this neglected group in the hope of furthering an in-

terest in their study. The following table contains only those species found north of Mexico:

1.—Third longitudinal vein branched.....2.
Third longitudinal vein simple.....13.
2.—First antennal joint less than twice the length of the second.....3.
First antennal joint more than twice the length of the second.....22.
3.—Eyes glabrous.....4.
Eyes pubescent.....24.
4.—Abdominal markings of the ♂ ♀ dissimilar.....5.
Abdominal markings of the ♂ ♀ similar.....6.
5.—Thorax: disc usually with two irregular markings.....**binotata** Loew.
Thorax: disc without markings (spines of the scutellum blunt).
varipes Loew.
6.—Face of both sexes yellow.....7.
Face of male black, female yellow.....**rufipes** Loew
7.—Abdominal markings triangular, attenuated and reaching the lateral margins.....**cincta** Oliv.
Abdominal markings triangular, not reaching the lateral margins.
dorsalis Fabr.
8.—Abdomen of the ♀ with transverse bands; ♂ with dorsal line.....9.
Abdomen of the ♀ with transverse bands; ♂ with only lateral markings at the posterior angles.....**inæqualis** Loew.
9.—Scutellum and spines yellow.....**arcuata** Loew.
Scutellum and spines black.....**flava** Say.
10.—Scutellum more or less yellowish, without spines.....11.
Scutellum black, with spines.....12.
11.—Scutellum wholly yellow; black of the vertex does not extend over the vertical angle.....**fallax** n. sp.
Scutellum, base black; black of the vertex extends over the vertical angle; proboscis longer.....**nigrirostris** Loew.
12.—Wings: veins very dark brown, face produced.....**nigerrima** Loew.
Wings: veins reddish, face rounded, front broad.....**pilosus** Day.
13.—Scutellum ♀ wholly green; ♂ brownish.....14.
Scutellum ♀ black, with lateral margin green; ♂ black.**texasiana** n. sp.
14.—Thorax (♀) disc with two green stripes; ♂ pleuræ yellowish.
trivittata Say.
Thorax (♀) disc without stripes; ♂ pleuræ black.....**vertebrata** Say.
15.—Front and vertex black.....16.
Front and vertex red.....**hydroleonoides** n. sp.
16.—Pile (pubescence) on the mesonotum short.....17.
Pile (pubescence) on the mesonotum moderately long..**americana** Day
17.—Abdomen with a wide dorsal line, usually narrower in the ♂ than in the female.....18.
Abdomen: dorsal line wanting; second, third, fourth and fifth segments entirely green.....**Aldrichi** n. sp.
18.—Front without yellow spots.....**virgo** Wied.
Front with yellow spots.....**pilimana** Loew.

19.—Abdomen black, with transverse marking, a lateral posterior angle.
Abdomen black, with a wide, continuous, lateral margin, third antennal joint tapering to a fine point.....**microstoma** Loew.
20.—Femora black; abdominal markings on the ♂ usually not triangular....21.
Femora yellow; abdominal markings on the ♂ usually triangular.
pubescens Day.
21.—Front and vertex marked with yellow.....**intermedia** Wied.
Front and vertex wholly black.....**hoodiana** Bigot.
22.—First and second joints of the antennæ black.....23.
First and second joints of the antennæ red.....24.
23.—Front and vertex wide, lateral thoracic stripe continuous.
hieroglyphica Oliv.
Front and vertex narrow lateral thoracic stripe only posteriorly of the suture.
similis n. sp.
24.—Eyes pubescent; scutellum of the ♀ yellow.....25.
Eyes glabrous; scutellum black, with yellow margin..**occipitalis** n. sp.
25.—Abdomen (♂) broad, with narrow markings pilose.....26.
Abdomen (♂) narrow, with wide marking, pubescent..**flavicornis** Oliv.
26.—Antennæ long; first and second joints yellow, third black..**obscura** Oliv.
Antennæ short; reddish or dark brown throughout.....**viridis** Bell.

Odontomyia binotata Loew (Pl. iii. figs. 29, 30, 31, 32).

Odontomyia megacephala Loew, Centur. vi. 20 (non *O. megacephala* Oliv.).

Odontomyia binotata Loew Centur. vi. 22; Day, Proc. Acad. Nat. Sci. Phila. 1882, 81.

Odontomyia bicolor Day, Proc. Acad. Nat. Sci. Phila. 1882, 78.

Length ♂ ♀ 11–14 mm. ♂.—Face, occiput and vertical angle green; vertical triangle black, ocelli yellowish, frontal triangle small, brownish; face with thin whitish pile, oral margins yellowish. Antennæ reddish; third joint dark brown, tip black, first and second joints subequal; palpi and proboscis yellow, end of the proboscis black. Thorax black with yellowish pile, long and dense on the sides: the green markings show the following variation: humeri and posterior angles green; marking at the posterior angle extends laterally to the suture; lateral stripe continuous from the humeri to the posterior angle, usually with two spots on the disc of the thorax; pleuræ green, pectus blackish; scutellum, basal half black, apical half green, sometimes totally greenish yellow; spines yellow, tips black. Abdomen green, with an irregular black dorsal stripe, reaching the posterior margin of the fifth segment and more or less contracted on the second and third segments, a small black spot is usually present at the anterior angle of the fourth segment; venter green. Legs reddish; basal half of the femora and tibiæ yellow, outer half of the femora, tibiæ and first joint of the tarsi reddish; tip of the tibiæ (especially the anterior and middle) and tip of the first and remaining joints of the tarsi brown, to brownish black. Wings hyaline, veins yellow, third longitudinal vein branched; discal cell emit three strong veins.

♀.—Face, front, occiput and vertical angle green; vertex, a wide, transverse line on the front midway between the antennæ and ocelli, and narrow lines at the vertical angle separating the green of the vertical from that of the occiput, black; in some specimens this latter character is wanting, and the vertical and frontal lines are narrowly connected by two longitudinal lines, thus forming three green spots on the front; in one specimen from Utah the frontal markings are

wanting. Thorax black, with thin yellowish pubescence; lateral stripe and two small spots on the disc of the thorax green, this latter character is variable, and may be wanting, or may be narrowly connected with humeri in some specimens, or with the posterior angle in others, or with both humeri and posterior angles, thus forming two irregular stripes; pleuræ green; pectus brownish; scutellum totally green; tips of the spines black, metanotum black. Abdomen green, marked with black as follows: first segment except the lateral margins; second with a large T-shaped marking; third with a large central triangle, laterally protracted to the lateral margin; fourth similar, except that the central area is larger and more quadrate; anterior half of the fifth with a large central spot, the lateral projections not quite reaching the margins; in other specimens the markings on the third segment are keystone- or anvil-shaped, and contains two small greenish spots.

Los Angeles County, California (Coquillett); Utah (Aldrich; Denver, Col. (E. V. Beales); Texas (T. E. Hood, Boston, Soc. Nat. Hist.); Wallace County, Kansas (F. H. Snow); Lincoln, Neb., July (Univ. Neb.); Algonquin, Ill. (Dr. W. A. Nason); Elkhart, Ind. (J. R. Weith); Constantine, Mich. (U. S. Nat. Mus.).

An *O. megacephala* was described by Olivier (Ency. Meth. 432, viii) from Egypt; I therefore adopt the second name given by Loew.

Odontomyia varipes Loew.

Odontomyia varipes Loew, Centur. vi, 21; Day, Proc. Acad. Nat. Sci. Phila. 1882, 84.

Length ♂ 12 mm.—Face green, vertical triangle black, ocelli yellowish, vertical angles green, frontal triangle minute, black; first two joints of the antennæ cylindrical, equal, reddish (third joint in the type specimen wanting); proboscis light yellow, labelli black. Thorax black, yellow pile; pleuræ, posterior angles and scutellum green; base of the latter with a triangular black spot, spines short, pectus black. Abdomen green, with an irregular dorsal stripe of black having the following characteristics on each segment: first except the posterior angles; second keystone-shaped, widest at the anterior margin; third somewhat wider than the second, slightly contracted in the middle, and attenuated along the anterior margin to the sides; fourth similar but slightly wider; fifth except a narrow lateral and posterior margin; venter wholly green. Femora yellow, outer half of the anterior, outer third of the middle and tip of the posterior femora, reddish; base of the tibiæ yellow; outer half of the tibiæ and tarsi reddish, brownish black at the extremities. Wings pure hyaline, veins yellow; third longitudinal vein forked, discal cell emits three equal veins.

Carolina (Loew).

The above description is based on the type specimen. The original description, describing the abdomen black with green markings, I have reversed, as this belongs to the group in which green predominates. It is closely related to *Odontomyia binotata*, but the head is smaller, the spines of the scutellum much shorter and blunt, legs darker, and the abdominal markings much different that the male of that species.

Odontomyia rufipes Loew.

Odontomyia rufipes Loew, Centur. vi, 25, ♂.

Odontomyia scalaris Loew, Centur. vi, 26, ♀.

Length ♂ 11 mm.—Head totally black; first two joints of the antennæ brownish black, subequal (third in the specimen described wanting). Face moderately prominent, convex, obtusely carinate, with whitish pile, proboscis black. Thorax totally black, with long whitish pile; on the pleuræ white and shaggy; scutellum yellow, base black. Abdomen yellow, with a medial stripe, on the anterior margin of the second segment dilated, the following segments with a single basal band wholly black; venter totally yellow. Legs reddish yellow; posterior tarsi in this specimen wanting. Wings pure hyaline, vein bright yellow; third longitudinal vein branched, discal cell emits two veins.

Length ♀ 11 mm.—Head yellow, occipital disc and an irregular vertical spot black; first two joints of the antennæ brownish black, subequal (third wanting). Face moderately prominent, convex, very obtusely carinate, pile white, medial stripe black; dorsal portion of the thorax black, golden pubescence, lateral margins with a wide border that extends from the humeri to the suture and the posterior angles yellow; pleuræ yellow, marked with black, pile white, pectus and metanotum black; scutellum totally yellow. Abdomen yellow, with a medial stripe; second and the following segments with a single anterior band of black; venter totally yellow. Legs reddish yellow; apex of the posterior tarsi brown. Wings pure hyaline, veins bright yellow, third longitudinal vein branched, discal cell emits two veins.

Cuba (Gundlach) Loew.

That these two descriptions apply to the same species as Mr. Loew suggests, there is not the slightest doubt.

Odontomyia cincta Olivier.

Odontomyia cincta Oliv., Encycl. Meth. viii, 432, 3; Macquart, Dipt. Exot. i, 2, 189; Day, Proc. Acad. Nat. Sci. Phila. 1882, 87.

Stratiomys cincta Walker, List, etc., v, 39.

Odontomyia extremis Day, Proc. Acad. Nat. Sci. Phila. 1882, 80; Williston, Can. Ent. xvii, 128.

Length ♂ ♀ 12 mm. ♂.—Face and frontal triangle light green, with whitish pile; vertical triangles and the proboscis black, ocelli yellow. Antennæ red, tip black. Thorax black with yellowish pile; lateral margins, scutellum and pleuræ green; basal centre of the scutellum black, spines yellow, tips brown, pectus black. Abdomen green, with a wide, irregular dorsal line of black, contracted at the posterior edge of the second and third segments, forming a triangular, or a keystone-shaped marking, that on the fourth square, and that on the fifth not reaching the posterior margin, and laterally attenuated to the margin; venter green. Legs yellow, three terminal joints of the tarsi. Wings hyaline, veins yellow; discal cell emits three veins, third longitudinal vein branched.

♀.—Face, front and occiput green, shining; frontal orbits with a prominent black spot; ocellar triangle black; in some specimens the black is laterally extended, and in one this is narrowly connected with the spots on the frontal orbits; the lateral strip of the thorax wider than in the male, and the tomentum golden yellow; scutellum totally green. Abdomen green, with a series of black dorsal triangles; in some there are laterally extended on the second and third segments

so as to form a band occupying one-half to two-thirds the anterior portion and usually narrowly reaching the posterior margin; band on the fifth segment occupying the anterior half. In other respects the color markings are the same as those of the male.

St. Augustine, Fla., March 15; Cape May, N. J., June 14; Brookings, S. D. (Aldrich); Connecticut (Williston); Douglas County, Kansas, June; Buffalo, N. Y. (Univ. Kans.); Algonquin, Ill. (Dr. Nason); West Point, Neb., June (Univ. Neb.).

I have recently received from Mr. V. H. Lowe, of the New York Agricultural Experiment Station, a ♀ specimen measuring only 8 mm.; it was taken at the Agricultural College, Michigan, June 17.

Odontomyia dorsalis Fabricius (Pl. iv, fig. 9).

Stratiomys dorsalis Fabr., Syst. Antl. 82, 20; Wiedemann, Auss. Zw. ii, 66.

Odontomyia dorsalis (Fabr.) Osten Sacken, Catl. 47 (non *O. dorsalis* White, Zool. Voy. Erebus and Terror).

Length ♀ 9 mm.; wing 8 mm.—Face, front, vertex and occiput, an obscure greenish yellow; translucent; minute yellowish pubescence, a spot on each side of the antennæ extending to the orbits; a transverse line obscurely interrupted on the front and a spot on each side of the ocelli brownish; ocellar triangle black, ocelli yellow. Antennæ and legs reddish brown, proboscis black. Thorax black, with short golden pubescence; a wide lateral line, pleuræ, scutellum and spines, yellow; pectus black, halteres green. Abdomen dingy yellow, with an irregular, blackish, dorsal line, consisting of a series of markings that are dilated at the anterior, and contracted at the posterior margins of the second, third and fourth segments; on the fifth it is only a small spot at the anterior margin; venter yellowish. Legs red, the last two joints of the tarsi brown. Wings hyaline, veins light yellow; discal cell emits three strong veins; third longitudinal vein branched.

One specimen, San Domingo (Frazer), University of Kansas coll.

This specimen agrees so well with Fabricius' brief description, that I feel very confident of its identification. Wiedemann gives its habitat as "South America," but Fabricius has "in Americæ Insulis."

Odontomyia inæqualis Loew.

Odontomyia inæqualis Loew, Centur. vi, 24.

Length ♂ 5½, ♀ 4¾ lin.; wing ♂ 4½, ♀ 3¾ lin. ♂.—Head black, middle of the lower part of the face, and from there to the edge of the anterior angle, light yellow. Antennæ black; first and second joints blackish, underside brown, proboscis black, palpi light yellow. Thorax black, pile yellow; pleuræ with two yellow spots, one irregular above the anterior coxæ; the other round in front of the wing; scutellum black, broad apical margin and very short spines greenish yellow, black at the extreme tip. Abdomen black; posterior margin of the second, third and fourth segments broadly interrupted, greenish yellow; on the second segment the markings are dilated and subtriangular, on the fourth somewhat obsolete; venter wholly greenish yellow. Legs yellow, tarsi from the apex

of the first joint brownish black, the base of the second is, however, lighter. Wings pure hyaline, veins decidedly yellowish, third longitudinal vein in one simple, in the other with an obsolete rudimentary branch, discoidal cell emits two veins.

♀.—Head yellow; occiput except the orbits black, front with four black spots, upper spots together with the minute black spot on the vertex confluent; thus also is formed a band on each side, which touches the margin of the eyes; the lower spots are obliquely drawn out, subcontiguous in the middle of the front and touching on each side the margin of the eyes. Face moderately prominent, convex, and adorned with a triangular black spot, proboscis black; palpi light yellow; dorsum of the thorax black, with a slightly golden tomentum, posterior angles greenish yellow; pleuræ greenish yellow, with a large black spot, which is connected with the black of the pectus; scutellum black, apical margin broad, spines small, greenish yellow; the extreme points black. Abdomen black, margins of the segments separate; lateral margins equal, posterior margins subequal, greenish yellow; venter totally greenish yellow. Legs yellowish (tarsi in the specimen described wanting). Wing pure hyaline, veins strongly yellowish, third longitudinal vein branched, discoidal cell emits two veins, fourth near the base very thin.

"Fort Resolution," Hudson's Bay Territory (Kennicot), Loew.

Odontomyia arcuata Loew (Pl. iii, fig. 35; Pl. iv, figs. 7, 8).

Odontomyia arcuata Loew, Centur. x, 4; Day. Proc. Acad. Nat. Sci. Phila. 1882, 80.

Length ♂ ♀ 9-11 mm. ♂.—Face and inferior orbits light yellow; pile white, an obscure transverse brownish line above the oral margin; frontal and vertical triangles black, ocelli yellow, proboscis black; first and second joints of the antennæ red; third dark brown, and narrowly annulated with black; dorsum of the thorax shining black; pile yellow, sparse, but long and dense on the sides; posterior angles obscure brown, pleuræ greenish yellow, pectus black; scutellum greenish yellow; base black, spines yellow, tip brown. Abdomen green, with an irregular black dorsal stripe, having the following contour: greatly contracted at the margins of the second and third; third and fourth, and the fourth and fifth segments, mark on the fourth segment somewhat wider than those on the second and third; mark on the fifth only extending to the centre of the segment, laterally attenuated; venter green. Legs yellow, tip of the first and the rest of the joints of the tarsi brown. Wings pure hyaline, veins light yellow, discal cell emits two strong veins, the other indicated only by an obsolete angle; third longitudinal vein branched.

♀.—Face, front, vertex and occiput yellow, pile light yellow; vertex and front with a transverse band of black, in the former not reaching the orbits, and sometimes narrowly extending in the middle over the vertical angle, in the latter sometimes narrowly divided in the middle and the frontal fossa is sometimes black, connecting the frontal and vertical bands. In some specimens there is a blackish, transverse marking above the oral margin, and in one specimen the facial prominence and a small dot on each side is also blackish; ocelli yellow, proboscis black; first and second joints of the antennæ red; third dark brown. Thorax black, with short, decumbent, golden-yellow pubescence, longer on the sides; posterior angles, pleuræ and in one specimen a small spot at the suture,

greenish yellow; pectus black; scutellum yellow, base narrowly black. Abdomen greenish yellow; second, third, fourth and fifth segments with a wide, transverse, black band, which does not reach the lateral or posterior margins; posterior edge of the bands on the second, third and fourth segments biarcuate; in some specimens this character is obsolete, or arcuated on the fourth. In the ten specimens before me this character predominates, although it is not typical; in one specimen which closely resembles the type the marking on the second segment is triangular, and on the other segments the biarcuate edge is wanting, and the anterior edge does not quite reach the margin of the segment towards the lateral portions

Six females, Los Angeles County, California, and one male San Bernardino Mountains, California, July 28 (Coquillett); Texas (Henshaw, coll. L. E. Hood); Denver, Col. (Beales); Rapid City, S. D. (Aldrich); Reno, Nev. (Hillman).

The male from South Dakota differs in having the the upper portion of the face and the pleuræ black; still it undoubtedly belongs to this species.

Odontomyia flava Day.

Odontomyia flava Day, Proc. Acad. Nat. Sci. Phila. 1882, 76; Williston, Can. Ent. xvii, 128.

♂.—Black. Head concolorous, antennæ black. Face small, black, clothed with yellowish pile; borders of the mouth slightly reddish. Thorax black, clothed with golden pile; scutellum black, the terminal spines concolorous, halteres yellow. Abdomen yellow, with black median stripe, the yellow running in at the incisures, thus forming connected quadrangular black spots in the segments; venter yellow, immaculate. Legs yellowish; femora brown; tarsi black, anterior and middle tibiæ with a solitary brownish ring. Wings hyaline, veins yellow, third longitudinal simple, the discal cell emits three veins, the posterior being rudimentary. Long. corp. 5½ lin.; long. al. 4 lin.

Hab.—Wyoming (Dr. Williston). Original description.

The following is Dr. Williston's description and remarks on this species in the "Canadian Entomologist."

"The type specimen in my collection is partly destroyed by Anthreni. I give as complete a description as it will permit.

"Length 11 mm. Head black, face of usual size, with two obscure yellowish spots below clothed with light colored pile; dorsum of the thorax black, with rather long light pile; scutellum black, the spines of the same color rather small and approximate. Abdomen black, with a rather narrow yellow margin, and with two slender, broadly interrupted, yellow posterior cross-bands (on the second and third segments); venter yellow. Legs yellow; femora at their base and the distal part of the tarsi brown, the tibiæ in their middle with a brownish ring. Wing hyaline, veins yellow, third longitudinal vein furcate, third posterior vein rudimentary.

"Como, Wyo. Resembles *O. inequalis* Loew, but differs in the scutellum and abdomen.

Odontomyia fallax n. sp.

Length 8 mm. ♀.—Face, front and occiput greenish yellow; shining, with sparse whitish pile; vertex, an irregular transverse band on the front extending downward in the centre and connecting with the subquadrate marking surrounding the antennæ, and a spot on each side of the oral margin black. Antennæ wholly black. Thorax black; tomentum yellow; lateral stripe and pleuræ greenish; lateral stripe sometimes slightly interrupted at the suture; scutellum entirely yellow, without spines. Abdomen black, second segment with triangular markings; third and fourth with subtriangular markings at the posterior angles, and the posterior margin of the fifth greenish yellow; venter greenish yellow. Femora and the outer half of the tibiæ black; all except the first joint of the tarsi brownish black; tip of the femora, basal half of the tibiæ and first joint of the tarsi reddish. Wings hyaline, veins yellow, third longitudinal vein branched, discal cell emits three veins.

Four specimens, southern Georgia (Morrison), U. S. Nat. Mus.

Odontomyia nigrirostris Loew (Pl. iii, figs. 36, 37).

Odontomyia nigrirostris Loew, Centur. vi, 19; Day, Proc. Acad. Nat. Sci. Phila. 1882, 83.

? Exchostoma caloceps Bigot, Ann. Soc. Ent. France, 1879, 217.

Length ♂ ♀ 12 mm. ♂.—Face, vertical and frontal triangles black, shining; face with long, whitish pile; epistoma, cheeks and inferior orbits yellowish; ocelli yellow. Antennæ black; proboscis long, black. Thorax and pleuræ black with long yellowish pile; scutellum black, with a wide yellow margin; without spines. Abdomen black, marked with yellow; a small marking at the posterior angle of the first segment, which, with the large lateral marking on the second, forms a triangle; those on the third and fourth consisting of an irregular transverse mark at the lateral posterior margin, fifth with a narrow posterior margin; venter yellow. Legs black, tips of the coxæ, base and tip of the femora, basal half of the tibiæ and first joint of the tarsi, yellow. Wings hyaline, veins yellow; discal cell emits three veins, third longitudinal vein branched.

♀.—Face, front and occiput yellow; shining, pubescence yellow, face with a large heart-shaped spot, and the vertex black, the black extending along the frontal orbits about half way down the front, leaving a middle line of yellow, which is contracted in the middle and forked at the top, but not quite reaching the ocellar triangle; in one specimen the black extends entirely across the upper portion of the front leaving only two small spots below the ocelli; a black line extends from the vertex over the vertical angle. Thorax black, pilose on the sides and pleuræ, humeri small, spot at the suture, posterior angle and pleuræ yellow, spot at the suture sometimes obsolete; pectus black, two small black dots on the pleuræ, one below the humeri and the other below the base of the wing; scutellum yellow, base (in the centre) black; marking on the first and second segments more prominent than in the male; that on the first much wider than the anterior edge of the second, posterior edge attenuated along the posterior margin; inner margin curved and forming, with the marking on the first segment, a half circle; in other respects it resembles the male in color.

Constantine, Mich. (Aldrich); Denver, Col. (E. V. Beales); Mantua Park, Col. (F. H. Snow, Univ. Kans.); Custer, S. D.; Big Horn Mountains, Wyoming (Univ. Neb.).

Odontomyia nigerrima Loew.

Odontomyia nigerrima Loew, Centur. x, 6; Day, Proc. Acad. Nat. Sci. Phila 1882, 82.

The following is Loew's description of the female:

Long. corp. 4 lin.; long. al. 3½ lin.—Black, shining, bare, short whitish pubescence. Head concolorous, longitudinal fossa of the front and both margins testaceous. Face extraordinarily prominent, protuberant, obtuse; lateral margins of the mouth strongly dilated; proboscis black, stock slender; head long and very thick. Antennæ slender, black; first joint once and a half as long as the second; scutellum wholly black, teeth fusco-testaceous; posterior margins of the second abdominal segment; third and fourth towards the side of the abdomen of a lutescent color, thus three narrow bands are seen broadly interrupted; the posterior margin of the fifth segment wholly lutescent; venter black, with a broad unequal disc, darkly lutescent; this abdominal picture in living specimens I suspect to be wholly green. Legs black, apex of the femora, base and apex of the tibiæ and first and last joints of the tarsi, except the apex, "fusco- luteo-testaceous." Wings hyaline, veins strongly brownish black; costal and third longitudinal subfuscous towards the apex, third longitudinal vein with erect branch, discoidal cell emits two veins

Middle States (Loew).

A male from Buffalo, N. Y. (Pl. iv, fig. 25), in the collection of the Kansas University I doubtfully refer to this species, it agrees with the type, except that the third longitudinal vein is simple.

Length ♂ 8 mm.—Face black; shining with long whitish pile; facial protuberance very prominent, obtuse; vertical triangle black. Thorax black, with prominent blackish pile; scutellum black, spines yellow. Abdomen black; second, third and fourth segments with small, subtriangular yellow spots at the posterior angles; fifth with prominent lateral and posterior margins; venter greenish yellow. Femora black; tips of the femora, the tibiæ and tarsi, yellowish; medial portion of the tibiæ and the last two joints of the tarsi brown. Wings hyaline, veins dark brown; discal cell emits two veins, third longitudinal vein simple.

Odontomyia pilosus Day (Pl. iv, figs. 13, 14).

Odontomyia pilosus Day, Proc. Acad. Nat. Sci. Phila. 1882, 76.

Odontomyia pyrrhostoma Bigot, Ann. Soc. Ent. France, 1887, 25.

Length ♂ ♀ 11 mm. ♂.—Face and vertical triangle black; face with long, dense, whitish pile; oral margin and ocelli yellowish. Antennæ black. Thorax and pleuræ black, with long yellowish pile; scutellum black, apical margin between the spines and the spines yellow. Abdomen black, shining, with long yellowish pile; second and third segments with a subtriangular yellow marking on the lateral posterior margin; in some specimens these are contracted at the angle, so that they reach the lateral edge only by a narrow line; markings on the fourth segment less prominent; fifth segment with a narrow lateral and posterior margin; venter yellow, with two small brownish dots in the middle of the third and fourth segments. Femora black; coxæ, tip of the femora, basal half of the tibiæ and basal joint of the tarsi yellow, tarsi and outer half of the tibiæ brown; the underside of the tibiæ shows an apical and middle annuli of black. Wings

hyaline, veins brown; discal cell emits two veins, third longitudinal vein branched.

♀.—Face, front and vertex black, dense yellowish tomentum on the face and occiput; vertical angle, a longitudinal line on each side of the frontal foveæ, oral margin and the lower part of the occiput yellowish; in one specimen the markings on the vertex and front are wanting; dorsum of the thorax and the scutellum with a dense yellowish tomentum, pilose on the pleuræ and pectus; abdominal marking less prominent than in the male, and not subtriangular.

Los Angeles County and Santa Clara County, California, April (Coquillett); Kern County, California (Univ. Kans.).

Odontomyia texasiana n. sp.

Length ♂ ♀ 9 mm. ♂.—Face black, with light yellow pile. Antennæ red; first and tip of the third joints black, proboscis black. Thorax black, with yellow pile, posterior angle yellowish; scutellum black, narrowly margined with dark yellow, spines yellow. Thorax black, with prominent, yellow, triangular markings at the posterior angles of the second, third and fourth segments; fifth with a narrow lateral and posterior margin; venter green. Femora black; tip of the femora, the tibiæ and tarsi red; tip of the tibiæ (sometimes) and the terminal joint of the tarsi brownish. Wings hyaline, veins yellow; third longitudinal vein simple, discal cell emits three veins.

♀.—Facial orbits, front, vertical angle and occiput green; vertex, two oblique angular spots on the front, which are narrowly connected with the black above the base of the antennæ and the face, black. Antennæ red; first and tip of the third joints black. Thorax black, with yellowish pubescence; a continuous lateral line, or only the humeri, an elongated spot before the suture and the posterior angles green; pleuræ green, sternum black; scutellum black, with wide lateral margins of green; spines yellow. Abdomen black; second, third and fourth segments with lateral, subtriangular markings that are greatly attenuated along the posterior margins; on third and fourth these are sometimes united, forming a wide posterior margin; fifth with a wide lateral and posterior margin.

Texas (Amer. Ent. Soc.); Waco, Texas (Belfrage), coll. C. V. Riley, U. S. Nat. Mus.

Odontomyia trivittata Say (Pl. iv, fig. 19).

Stratiomys trivittata Say, Jour. Ac. Nat Sci. Phila. vi, 160; Compl. Wr. ii, 356.
Odontomyia tritæniata Bellardi, Saggio, etc., i, 38, tab. i, fig. 17.
Odontomyia tritæniata Osten Sacken, Biol. Cent.-Amer. Dipt. 36.

Length ♂ ♀ 6-8 mm. ♀.—Face, front, vertex and occiput greenish yellow; a small black dot on each side of the facial prominence; a transverse, wavy line across the front that projects downward above the antennæ; a spot on the orbits opposite the base of the antennæ, and a spot on each side of the ocelli brownish (the frontal markings vary considerably, and are sometimes obsolete); ocellar area and proboscis black. Antennæ yellowish, tips brownish. Thorax brownish black, narrowly divided by green lines into three broad vittæ, these are widest anteriorly, and gradually attenuated posteriorly; lateral stripe, pleuræ and scutellum green, spines yellow; metanotum and pectus brownish black. Abdomen greenish, with a more or less prominent, black, interrupted, dorsal line, the black markings surrounded by a brownish stain; venter green. Legs yellow, terminal

joints of the tarsi brownish. Wings hyaline, veins yellow; third longitudinal veins simple, discal cell emits three strong veins.

♂.—Face and base of the vertical triangle yellowish; vertical triangle black. Thorax black; lateral stripe (obsolete near the humeri), pleurae and scutellum yellowish; base of the scutellum brown.

Ten specimens; Bird's Island, near Astor, Fla., May 11; St. Augustine, Fla. (F. H. Genning); Colorado (collection C. V. Riley, U. S. Nat. Mus.); City of Mexico (Sallé); Cuantle, Mex. (de Saussure); Guatemala (Champion).

The specimen (♂) from Texas has the abdomen greatly discolored (brownish). Most of the specimens before me have been collected for some time, and are greenish yellow, but a specimen (♀) recently collected near Astor, Fla., is bright green. A specimen (♂) recently taken by Mrs. Slosson at Ormond, Fla., the abdomen is bright green.

Odontomyia vertebrata Say (Pl. iv, figs. 26, 27, 28).

Odontomyia vertebrata Say, Long's Exped. App. 369; Compl. Wr. 251; Wiedemann, Auss. Zw. ii, 73, 20; Bellardi, Saggio, etc., i, 38; Day, Proc. Acad. Nat. Sci. Phila. 1882, 85.

Stratiomys vertebrata Walker, List, etc., v, 39.

Odontomyia Willistoni Day, Proc. Acad. Nat. Sci. Phila. 1882, 78, ♀.

Length ♂ 8 mm.—Face brownish; cheeks and oral margins black, facial prominence red. Antennæ brown, base and tip black; ocellar triangle black. Thorax black, with whitish pubescence; posterior angle and scutellum red, base black, spines light green. Abdomen yellowish white, with a variable dorsal line of black, extending to the anterior part of the fifth segment; in some this line resembles that of *O. plebeja*, but with edges more irregular, in others the line on the second and third segments is narrow, and of a brownish color, while in others it is broadly interrupted, the markings on the second and third segments consisting only of a spot at the anterior margins; the size of the roundish marking on the fourth segment is quite constant; venter yellowish white. Legs yellow. Wings hyaline, veins light yellow, discal cell emits three veins, third longitudinal vein simple.

Length ♀ 9 mm.—Face smooth, shining; front and vertex rugose; face and front bearing two or three colors; green with yellow and brownish black markings, or a uniform yellow with the brownish black markings; the latter are arranged as follows: a spot more or less prominent on each side of the oral margin; a spot on each side of the facial prominence, a transverse line above the antennæ not reaching the eyes; an irregular transverse line across the front and vertex, the ends of the latter sometimes curved downward and connecting with the former; they are sometimes also connected by a central longitudinal line extending from the ocelli, giving the front a reticulated appearance; occiput green, or greenish yellow. Antennæ black, second joint brown. Thorax black, with short golden pubescence, forming in certain lights two dorsal stripes; humeri green, a green lateral stripe commences just before the suture and extends to the base of the scutellum; this stripe contains a small black spot above the base of the wing;

scutellum green, spines yellow; pleuræ green, with irregular black markings; pectus black. Black of the abdomen consisting of a series of broad bands rarely reaching the lateral margin, and having a triangle or square of green or greenish yellow at the posterior angle; posterior edge of the band on the fifth segment with a deep sinus.

Fifteen specimens (♂ ♀), "the neck," Philadelphia, June 27 (Charles Liebeck); Anglesea, N. J. (♂ ♀), July 19; South Dacota ♂ ♀ (Aldrich); Agricultural College, Michigan (Davis); Newtonville, Mass. (Henshaw); St. Louis, Mo., July 28 (Riley); Mexico? (Bellardi). I am doubtful whether Bellardi had Say's species.

Odontomyia hydroleonoides n. sp. (Pl. iv, fig. 10).

Length ♀ 7–10 mm.—Front, vertex, occiput and upper half of the face reddish, lower half of the face blackish; base of the antennæ surrounded by black, from which extends the following more or less prominent lines: a narrow line to the ocellar triangle, a wider one over the facial prominence, the oblique lines to the black on the lower part of the face and a narrow transverse line to the lower part of the face; ocellar triangle black, the black extending over the vertical angle. Thorax black, with short yellowish pubescence; scutellum black, apex and spines brownish (in one specimen yellow), spines very short. Abdomen green, with a wide and quite regular black dorsal stripe; venter green. Legs yellow. Wings hyaline, veins light yellow; discal cell emits two veins and shows an angulation at the origin of the third vein, third longitudinal vein simple.

Toronto, Canada, July 7 (Wm. Brodie); Agricultural College, Michigan, July 23 (Davis); Illinois (Amer. Ent. Soc.); Ogden, Utah, June 20 (collection C. V. Riley, U. S. Nat. Mus.).

I was inclined at first to consider this an introduced species (*O. hydroleon* Linné, of Europe), but in comparing these with a specimen from Germany, I hardly felt justified in uniting the two. The European species differs from this in having the face almost wholly reddish, the front and vertex noticeably narrower, the spines of the scutellum almost double the size and apical margin more prominent, and the dorsal stripe of the abdomen wider and more irregular. The force of the suggestion that *O. hydroleon* has been introduced, seems somewhat lessened when we consider the wide distribution of this species. The male will probably closely resemble that of *O. virgo* or *O. pilimana*.

Odontomyia americana Day.

Odontomyia americana Day, Proc. Acad. Nat. Sci. Phila. 1882, 77.

♂.—Black. Head black. Antennæ reddish brown; the second joint as long, or longer than the first. Face small, not prominent; proboscis black. Thorax black and covered with a yellowish white pubescence; scutellum the same, the apical spines being yellow; halteres green. Abdomen green, with a median black stripe of nearly equal breadth throughout; venter green, immaculate.

Legs yellow. Wings hyaline, veins yellow, the third longitudinal simple, the discoidal cell emitting two veins. Long. corp. 4 lin.; long. al. 3 lin.

Hab.—California (Baron).

The above is Dr. Day's original description. To this Mr. W. A. Snow adds the following: "Head black, near oral margin brownish. Antennæ reddish. Face strongly receding; pile white. Thorax black, punctate, pile long, obscure whitish; scutellum at the apex and the spines yellow; halteres green, third vein is simple, four posterior cells. Length 9 mm. Two males, California (Baron). In the Kan. Univ. collection."

Six females from Yakima City, Wash., in the Osten Sacken collection at Cambridge, labeled *O. americana* Day, has the face and front a uniform shining black, and the median black abdominal stripe nearly of a equal with and not dilated as in the female *O. virgo* Wied. The latter has not been recorded west of Kansas.

Dr. Williston says, "*O. americana* Day, is very distinct in the moderately long pile (not 'pubescence') of the metanotum."

Odontomyia Aldrichi n. sp. (Pl. iv, fig. 17).

Length ♂ ♀ 9-10 mm.—Face and vertical triangle black; shining with whitish pile on the cheeks and facial orbits. Antennæ reddish, tip of the third joint black. Thorax black, with yellowish white pile, which is longest on the pleuræ and pectus; scutellum black, apical margin between the spines and spines yellow. Abdomen entirely green, except a small, black, lunate spot in the middle of the first segment; in one specimen this is divided into two small arcuate spots; venter green. Legs yellow. Wings hyaline, veins yellow; discal cell emits two veins, the third indicated only by a slight angle of the discal cell, third longitudinal vein simple.

♀.—Face, front and vertex black, shining; pile sparse, whitish and arranged in tufts on the frontal and facial orbits; occiput black, with a dense, yellowish pubescence; two small yellow spots on each side of the frontal fossa, below the ocelli. Thorax black, with short yellow pubescence, whitish on the pleuræ; scutellum black, with black pubescence; inferior apical margin yellow.

Riley County, Kansas, June (Marlatt); Sand Hills, Neb., July ♂ (Aldrich), with the same habitat and data ♀; and West Point, Neb., ♂ June (Univ. Neb.).

Odontomyia virgo Wiedemann (Pl. iv, figs. 31, 32, 33, 34, 35).

Odontomyia virgo Wied., Auss. Zw. ii, 69, 13.
Stratiomys virgo Walker, List, etc., v, 39.
Odontomyia plebeja Loew, Centur. x, 5.
Odontomyia nigra Day, Proc. Acad. Nat. Sci. Phila. 1882, 75.
Odontomyia paron Walker, List, etc., iii, 536.

Length ♂ ♀ 7-10 mm.; wing 6-8 mm. ♂.—Face black, shining, with whitish pile; ocellar triangular black, ocelli brownish. Antennæ reddish, terminal joint dark brown. Thorax black, covered with yellowish pubescence, longest on the

pleuræ; scutellum black, spines yellow; halteres green. Abdomen varies from a bright green to greenish yellow, or bright yellow, with an irregular black dorsal stripe, forming on the second, third and fourth segments a series of keystone-shaped markings, that on the fourth being usually the largest, stripe ending with a triangular spot at the base of the fifth segment; venter green. Legs yellow. Wings hyaline, veins yellow, discal cell emits two veins; third longitudinal vein simple.

♀.—Face, front and vertex broad, shining black, with white pile, more conspicuous in patches on the orbits; inferior orbits yellow; occiput with thick whitish pubescence. Thorax black, with short yellowish white pubescence; the abdominal stripe usually wider than in the male, so that the green on the third, fourth and fifth segments consists only of a narrow lateral, and on the fifth a posterior margin.

Southeastern Pennsylvania and southern New Jersey, June and July, common; Franconia, N. H. (Mrs. Slosson); Connecticut and Virginia, June 13 (Williston); Algonquin, Ill. (Dr. Nason); Custer, S. D. (Aldrich); West Point, Neb., June 24 (Univ. Neb.); Kansas (E. W. Guilding) Day; Georgia (Wiedemann); southern Georgia (Morrison); Colorado (Riley); Texas (J. B. Smith); Springfield, Mass. (Dimmock); Agricultural College, Michigan (Lowe); Murfreesborough, N. C., June 8.

The above description is based on a series of over forty specimens. Between the smaller specimen determined as *O. virgo* by Loew, and a somewhat larger one, the type of his *O. plebeja*, I cannot draw the line. The color of the antennæ are variable, the third joint is sometimes reddish, except the tip; in others it is wholly dark brown, while others show intermediate conditions.

Odontomyia pilimana Loew (Pl. iv, figs. 11, 12).

Odontomyia pilimana Loew, Centur. vi, 27; Day, Proc. Acad. Nat. Sci. Phila. 1882, 83.

Length 9 mm.; wing 7 mm ♀.—Face, front and vertex black, shining, with whitish pile, which is more conspicuous in patches along the orbits; a spot on the lower part of the facial orbit and two small spots below the ocelli on each side of the frontal fossa yellow; occiput with dense whitish pubescence. Antennæ red, tip of the third joint black; proboscis black. Thorax black, with a dense aureus pubescence, whitish on the pleuræ; scutellum black, spines yellow; halteres green. Abdomen greenish yellow, with a black dorsal stripe, narrow on the first and second, and expanding to three times this width on the third and fourth; fifth with an anterior central spot, leaving a posterior and lateral margin of uniform width; venter green, or greenish yellow. Legs yellow. Wings hyaline, veins yellow, third longitudinal with branch; discal cell emits two valid and one rudimentary vein; four posterior cells and one submarginal.

♂.—Face, frontal and vertical angle black, with sparse whitish pile; ocelli yellow, facial protuberance prominent, obtusely carinate; the abdominal stripe not as wide on the third and fourth segments as in the female.

Brookings, S. D. (Aldrich); Champaign County, Illinois (W. A. Snow); Algonquin, Ill. (Dr. Nason); West Point, Neb., July (Univ. Neb.).

Odontomyia microstoma Loew (Pl. iv, fig. 20).

Odontomyia microstoma Loew, Centur. vi, 28.

Length ♀ 12 mm.—Face, front and vertex yellow, sparsely covered with yellow pile below the antennæ, shining above; first two joints of the antennæ brown, base of the first and outer end of the second darker, terminal joint black, gradually tapering to a point; about half way between the antennæ and ocelli is a short, transverse line or spot; ocellar triangle black, and on each side a brownish spot; occiput yellow. Thorax black, densely clothed with short, yellow tomentum; humerus and posterior angle yellow; scutellum yellow, spines tipped with black, pectus black. Abdomen with a broad, brownish black dorsal stripe, with lateral margins of yellow, the dorsal stripes varies greatly in color from a uniform black with a yellowish triangle on the posterior margin of the fourth segment to a brownish yellow, with the posterior margins of the segments darker and sometimes a yellow interrupted dorsal line; venter yellow, with a dark brown marginal stripe. Legs yellow, two or three of the terminal joints of the posterior tarsi brown. Wings hyaline, veins yellow, third longitudinal vein simple, discoidal cell emits two veins.

Length ♂ 10 mm.—Face and vertical triangle black, the former with yellow pile. Antennæ black. Thorax uniform black, pile yellow; scutellum black, with a broad posterior margin of yellow. Abdominal markings uniform black, the yellow triangle on the fourth segment very small or wanting. Femora, except the tip, brownish black, a brown band on the middle of the tibiæ, and the posterior tarsi brownish.

Common at Anglesea, N. J., July 19; Cape May, June 22; Maryland (Aldrich); New York (Williston); Chelsea, Mass., July 31 (Henshaw).

I have only collected and received this species from localities near the sea-shore. In the form of the third antennal joint there is quite a divergence from the typical Odontomiæ. A universal study of this group may give it generic or subgeneric rank. Loew refers to it as follows: "The last two segments of the third antennal joint in this species forms a sufficiently acute style, as may be shown; the antennæ of this are not dissimilar to those of *Clitellaria*, but the downward course of the veins in this species demonstrates its place in the Odontomyiæ."

Odontomyia pubescens Day (Pl. iv, figs. 15, 16).

Odontomyia pubescens Day, Proc. Acad. Nat. Sci. Phila. 1882, 77.

Length ♀ 10 mm.; wing 8 mm.—Face and front black with yellow pubescence, which is lighter and longer on the face; frontal longitudinal fossa with its margins and a spot on each side of the ocelli yellow. Antennæ black. Thorax black, with short, golden-yellow pubescence; scutellum black, apical margin and spines

red. Abdomen black, with yellow transverse markings at the lateral posterior margins of the second, third and fourth segments less prominent on the fourth; the markings on the second and third gradually enlarge toward the inner end; posterior margin of the fifth and lateral margins of all the segments yellow; venter yellow. Legs totally reddish yellow. Wings hyaline, veins yellow, discal cell emits two veins.

Described from a type specimen, the venter of which is discolored. In the twenty specimens before me the venter (unless discolored) is of a uniform greenish yellow; the abdominal markings vary considerably, being sometimes of a uniform width. The color markings on the front and vertex were apparently disregarded in the original description.

♂.—The yellow pile of the thorax is longer, the apical margin of the scutellum slightly narrower and the abdominal marking more prominent, and sometimes of a subtriangular form on the second segment.

In the specimens before me I see no trace of black on the tip of the femora as originally described.

Denver, Col. (Beales); West Point, Neb., May; Brookings, S. D., June 11 (Aldrich); Agricultural College, Michigan (Davis); Brookline, Mass., May 27, June 12; and White Mountains, N. H. (Henshaw); Maine; Canada (Mus. Comp. Zool.); Arizona (Williston); California (Baron); Algonquin, Ill., June 4 (Dr. W. A. Nason).

The specimens from the Central States are somewhat smaller (8 mm.). In the Museum of Comparative Zoology, in Loew's hand writing, is a MS. name for this species (*Odontomyia latipes*). This species may readily be distinguished from *O. intermedia* Wied. by its uniform reddish yellow legs. Mr. Snow has informed me, and it has been verified by Mr. Henshaw, by whom they were collected, that the habitat New York, for the types, should be Massachusetts. Day took the label "Brook." for Brooklyn, N. Y., instead of Brookline, Mass.

Odontomyia interrupta Olivier (Pl. iv, figs. 29, 30).

Odontomyia interrupta Oliv., Encycl. Meth. viii, 433, 8.
Odontomyia intermedia Wied., Auss. Zw. ii, 64, 5.
Stratiomys intermedia Walker, List, etc., v, 38.

Length ♂ ♀ 8 mm. ♂.—Face black, with whitish pile, thickest on the sides; ocellar triangle, antennæ and proboscis black. Thorax black, with whitish pile; scutellum black, apex brown, spines yellow. Abdomen black, the latral posterior margin of the second, third and fourth segments light yellow, or greenish yellow, thus three bands are seen broadly interrupted in the middle; this intermediate space being about one-third the total width of the abdomen; fifth with a narrow

posterior margin and all the segments with a narrow lateral margin; the markings on the second segment are sometimes widened at the lateral margin forming a triangle at the posterior angle; venter greenish. Femora black, tip of the femora, basal half of the tibiæ and tarsi, yellow; outer half of the tibiæ and tarsi brown; in some specimens the tibiæ and tarsi are almost a uniform yellow, or yellowish red; in the latter case the posterior coxæ are more or less yellow. Wings hyaline, veins yellow, discal cell emits two veins, third longitudinal vein simple.

♀.—Face black with white pile, front black with yellow pile; frontal longitudinal fossa with its margins and a spot on each side of the ocelli, yellow; pubescence of the thorax short and of a golden-yellow; margin of the scutellum prominent and yellow. Legs usually lighter than the ♂.

Philadelphia, May 15; Brookline, Mass., May 27, June 12 (Henshaw); New York and Franconia, N. H. (Mrs. Slosson); Algonquin, Ill., June 8 (Dr. W. A. Nason); Brookings, S. D.; West Point, Neb., April (Aldrich); Minnesota (Amer. Ent. Soc.); Carolina (Olivier).

The black femora and the more regular size of the abdominal markings distinguishes this species from the preceding, "except the 'Rand mahl ven braun' the description of *Odontomyia intermedia* applies exactly to this species." MS. note of Osten Sacken, Museum of Comparative Zoology.

The species is also marked "*O. crassirostris*," a MS. name given by Loew in his collection at Cambridge.

Odontomyia hoodiana Bigot.

Odontomyia hoodiana Bigot, Ann. Soc. Ent. France, xxxviii, 1886, 25.

Length ♂ ♀ 8–10 mm. ♂.—Face black, shining, with long yellow pile, vertical triangle black, ocelli yellow. Antennæ black. Thorax black, shining, pile yellow, long and dense on the pleuræ; scutellum black, shining, apical margin between the spines and the spines yellow. Abdomen black, shining, pile yellow, sparse; second, third and fourth segments with a transverse yellow marking at the lateral posterior margin; lateral and posterior margins of the fifth yellow; venter greenish yellow. Femora black; tips of the femora, tibiæ and tarsi yellow, tibiæ with a medial band of black or brown, the outer portion of the tarsi brown. Wings hyaline, veins reddish, discal cell emits two veins, the third indicated only by an obsolete angle

♀.—Face, front and vertex black, pile yellow. Thorax black, pubescence short, yellow, procumbent; scutellum black, apical margin between the spines and spine yellow. Abdomen black, shining, markings somewhat narrower than in the male.

Tuolumne County, California; British Columbia (Coquillett); Craig's Mountain, Idaho (Aldrich).

This species is nearest related to *O. interrupta* Oliv. and *O. pubescens* Day, but differs in the absence of yellow markings on the front and vertex, and the less prominent margin of the scutellum.

The only point in which these specimens differs from Bigot's description is in the abdominal markings, "demi-bande subtrigonale fauve," but considering the great variation of its nearest allied species, especially in the male, which was Bigot's type; I can only refer these specimens to this species.

Odontomyia hieroglyphica Olivier (Pl. iv, figs. 4, 5).

Odontomyia hieroglyphica Oliv., Encycl. Meth. viii, 434.

Length ♂ 10 mm.—Face black, pile yellow, facial protuberance prominent; occiput and a transverse facial marking (contracted in the middle) between the oral margin and the facial protuberance but not reaching the eyes, yellow. Antennæ brownish black; base of the first and second joints reddish. Thorax black, with long, thick, yellowish pile; scutellum black; lower edge of the outer margin yellow, spines small, yellow. Abdomen black, pile yellow, much wider than the thorax; second segment with a large lateral triangle; third and fourth with a subtriangular marking at the posterior angles, largest on the third; posterior margin of the fifth and the lateral margins of all except the first segment, yellow; venter greenish yellow; fourth segment with a medial, black square, in the centre of which is a yellow spot; fifth with a narrow anterior margin. Femora black; distal half of the tibiæ and last two joints of the tarsi, brown; tips of the femora, basal half of the tibiæ and tarsi yellow. Wings hyaline, veins light yellow, discal cell emits three veins, third longitudinal vein simple

Length ♀ 11 mm.—Face, front, vertical angles and occiput, green; shining, with sparse, yellow pubescence; a subquadrate black spot surrounds the base of the antennæ; the lower edge of which has prominent projections at the angles and on the facial prominence, the latter connecting with the edges of the oral margin; a short, transverse line extends on each side from the frontal orbits about midway between the antennæ and vertex, and a line the width of the ocelli across the vertex black. Antennæ and proboscis black. Thorax black, with short, yellowish pubescence: humeri, lateral stripe and scutellum, green; spines yellow; pleuræ green, with a black spot that is connected with the black on the pectus. Abdomen black: first segment with small, green triangles at the posterior angles; second with prominent ones, those on the third about one-half the size of those on the second, and those on the fourth about one-half the size of those on the third; posterior margin of the fifth, and a narrow lateral margin on all the segments and venter green. Legs black; tips of the femora, basal half of the tibiæ, and the first three joints of the tarsi yellow; the outer half of the anterior and middle tibiæ are brownish black. Wings yellowish hyaline, veins brown, discal cell emits three veins; third longitudinal vein simple.

Massachusetts, July (Univ. Kans.); Virginia (Amer. Ent. Soc.); District of Columbia, May 19; Allegheny, Pa., June 7 (Aldrich); Carolina (Loew); Morris County, N. J., June 25.

Odontomyia similis n. sp. (Pl. iv, fig. 6).

Length ♀ 10 mm.; wing 8 mm.—Face, front and occiput, yellow; shining, with yellow pile; edge of the oral margin black and connected with a large, black, arrow-shaped spot that surrounds the antennæ; from this extends a frontal line about half way to the ocelli, and from this extends, at right angles, wavy

lines to the orbits; vertex, antennæ and proboscis black. Thorax black, with yellow pile, a small spot at the humeri; posterior angles and a lateral line extending to the base of the suture, yellow; pleuræ yellow, with two black spots, the anterior one connected with the black of the pectus; scutellum yellow; spines small, halteres light yellow. Abdomen black, with yellow and black pile; second segment with a subtriangular marking at the lateral posterior angles; third and fourth with a transverse marking on the lateral posterior margins; that on the fourth about one-half the size of that on the third; fifth with a lateral and posterior margin; lateral margin narrowing anteriorly; vertex yellow. Femora black, distal half of the tibiæ brownish black, the anterior and middle tibiæ showing on the underside an apical and medial annuli, tip of the femora and base of the tibiæ yellow, base of the tarsi red, the remainder a dark brown. Wings hyaline, veins reddish, discal cell emits three veins.

One specimen, Colorado (J. M. Aldrich).

This species is nearest allied to *O. hieroglyphica*, but differs in having a much narrower front, a short longitudinal frontal line of black, the absence of a continuous lateral line on the thorax and narrower abdomen. The specimen before me is bright yellow, while *O. hieroglyphica* is bright green, but this is of little moment.

Odontomyia occipitalis n. sp. (Pl. iv, figs. 23, 24).

Length ♂ ♀ 10 mm. ♂.—Face, frontal and vertical triangle black; shining, with whitish pile; lower half of the face more or less yellowish. Antennæ, first and basal half of the second brown, outer half of the second, and the third black; ocelli yellow. Thorax black, with yellowish pile; most prominent on the pleuræ; pleuræ marked irregularly with yellow (in one specimen black), pectus and scutellum black; a narrow apical margin between the spines and the spines yellow; spine very small. Abdomen black, segments marked with yellow as follows: second with a wide, lateral margin, slightly protracted along the lateral posterior margin; third and fourth with a narrow lateral margin and a triangle at the posterior angles (in one specimen obsolete on the fourth); fifth with a narrow, lateral and posterior margin; venter yellow; base of the third, fourth and fifth segments narrowly margined with black; margin interrupted on the third. Legs black, tip of the femora, base of the tibiæ and tarsi yellow; outer half of the tarsi brownish. Wings hyaline, veins dark brown; discal cell emits three veins, third longitudinal vein simple.

♀.—Face, front and occiput yellow, the latter very prominent; mouth, and on each side, and at the upper angle of the oral margin, black; a large, black, transverse spot surrounds the base of the antennæ, which project above and below the antennæ and at the lower corners; a transverse black spot extends from the frontal orbits and almost connects with that surrounding the antennæ; a large black spot surrounds the ocelli, which is very narrowly attenuated to the vertical orbits; a narrow line also extends over the vertical angle. Thorax dull black, with very short yellowish pubescence; posterior angle, from which extends a post-alar line nearly reaching the suture, and the pleuræ yellow; scutellum black, widely margined with yellow. Abdomen dull black; the markings differ from those of the male in being less triangular, and might be described as lateral mar-

gins, slightly widening at the posterior angles; posterior margin of the fifth subtriangular, there is also an obsolete spot near the posterior angle of the first segment; tarsi lighter than in the male.

Pennsylvania; Virginia (Amer. Ent. Soc.).

The above description is based on one female (Pennsylvania) and two males (Virginia) in the collection of the American Entomological Society. In antennal characters it closely resembles *O. flavicornis* Oliv., but the eyes of the male are glabrous. The species is readily distinguished by its dull black color and absence of prominent lateral transverse markings.

Odontomyia flavicornis Olivier (Pl. iv, figs. 21, 22).

Odontomyia flavicornis Oliv., Ency. Meth. viii, 433, 9; Macquart, Hist. Nat. Dipt. i, 243, 4; Day, Proc. Acad. Nat. Sci. 1882, 87.

Stratiomys flaviceps Macquart, Hist. Nat. i, 245.

Stratiomys coronata Guerin, Iconogr. Texte, 544, tab. 98, fig. 5.

Stratiomys pulchella Macquart, Dipt. Exot. i, 1, 180, 3; tab. xxii, fig. 2.

Stratiomys vicina Macquart, Dipt. Exot. i, 1, 181, 4 ("♂ of *S. flaviceps?*") (non *Odontomyia vicina* Macq., Dipt. Exot. i, 188, 11, Cuba).

Odontomyia lasiophthalma Loew, Centur. vi, 23, ♂.

Length ♂ 9 mm; wing 7 mm.—Face black, whitish pubescence, a spot on the facial orbits and on each side of the oral margin yellow; eyes conspicuously pilose; first and second joints of the antennæ yellow, third brownish black; the first joint more than double the length of the second. Thorax black, with yellowish pile; posterior angle, a large angular and small ovate spot on the pleuræ, yellow; scutellum black, narrow margin and spines yellow, spines small, halteres green. Abdomen black, with greenish yellow markings; second segment with large lateral triangles; third with a subtriangular marking at the posterior angles, not reaching the anterior margin; fourth with transverse markings at the lateral posterior margin; fifth with lateral and posterior margin; venter greenish yellow. Femora black; tips of the femora, tibiæ and tarsi yellow, posterior tibiæ with a middle and apical band, and the tips of the tarsal joints red. Wings hyaline, veins light yellow, discal cell emits three veins, third longitudinal vein simple.

♀.—Face, front and occiput yellow; vertex, a large quadrate spot surrounding the antennæ, an M-shaped marking on the front, facial groove and a spot on the epistoma margin black. Thorax black, with yellow pubescence; humeri, lateral stripe, scutellum and pleuræ, yellow; pectus black. Abdomen black, lateral margin of the first, a large triangle in the posterior angles of the second and third, an elongated spot at the posterior angle of the fourth occupying about two-fifths of the posterior margin; posterior margin of the fifth, and a narrow lateral margin on all the segments, yellow; venter yellow.

Delaware County, Pennsylvania, July 7. Two specimens, Illinois (Amer. Ent. Soc.); New York (Loew); Caldwell, N. J. (Crane); North Carolina (Riley).

Odontomyia obscura Olivier.

Odontomyia obscura Oliv., Ency. Meth. viii. 433, 7; Macquart, Dipt. Exot. i, 2, 189; Day, Proc. Acad. Nat. Sci. Phila. 1882, 88.

Odontomyia brevipennis Oliv., Ency. Meth. viii. 434, 13; Day, Proc. Acad. Nat. Sci. Phila. 1882, 86.

? Stratiomys obscura Walker, List, etc., v. 38.

Length ♁ 10 mm.—Face and vertical triangle black with yellow pile; first and second joints of the antennæ yellow, extreme tips of each brownish; third joint black, proboscis black. Thorax black, densely covered with yellow pile; scutellum black, spines small, yellow; halteres greenish. Abdomen black, with dense yellow pile; second and third segments with yellow triangles at the posterior angles (smallest on the third), which are greatly attenuated along the posterior margin; a narrow lateral margin of yellow to all except the first segment; there is a slight extension of this margin along the posterior edge of the fourth; venter yellow, slightly marked with black. Femora black, tips of the femora, tibiæ and tarsi yellow, an obsolete medial and apical band on the anterior and middle tibiæ and the outer half of the posterior tibiæ brownish. Wings hyaline, veins yellow, discal cell emits three veins, third longitudinal simple.

♀.—Face, front and vertex black; shining, with whitish pile, facial protuberance prominent; vertical angle, occiput, a transverse band across the upper portion of the front (slightly interrupted), two irregular spots between this and the antennæ, which are laterally attenuated and narrowly connected with spots on the orbits opposite the base of the antennæ; cheeks and a spot on each side of the upper angle of the epistoma yellow. Thorax black, with yellowish pubescence, pilose on the pleuræ and pectus; an irregular spot on the pleuræ and scutellum greenish yellow; spines yellow and very small. Abdomen black; the yellow triangles are obsolete, but indicated by the much longer, whitish tomentum, two yellow subdorsal spots on the posterior margin of the second segment represent the inner angles of the triangles so prominent in the male; a narrow, continuous, lateral margin to all except the first segment, and the posterior margin of the fifth yellow; venter black, posterior margin of the first, and a large quadrate mark on the second, greenish yellow.

St. Augustine, Fla., ♁; Charlotte Harbor, Fla., March, ♁ ♀ (Mrs. Slosson); Carolina (Olivier); Boykins and Norfolk, Va., June 10, 12.

Olivier undoubtedly had the male and female of the same species. The specimens before me agree so well with his descriptions that I have no doubt of their identity.

Odontomyia viridis Bellardi (Pl. iv, fig. 18).

Odontomyia viridis Bell., Saggio, etc., i, 36, tab. i, fig. 16.

♀.—Green, marked with black. Head broad, front very broad, with transverse black stripes: first on the vertex; third at the base of the antennæ; second intermediate, arcuate, and interrupted; eyes small, obsoletely tomentose; posterior margin green. Antennæ short, reddish. Face green, prominent, with two black spots, epistoma near the sides black, palpi yellow, proboscis thick, wholly black; dorsum of the thorax black, golden tomentum; a broad, green, longitudinal stripe from the humeri to the base of the wings; lateral margin black,

pleuræ green, pectus black; scutellum green, spines yellow, very short, halteres green. Abdomen short, depressed, subquadrate, posterior subtruncate; green with black markings; first segment immaculate, marking on the second triangular, anterior and posterior dilated, near the side curved; third, fourth and fifth broadly marked, anterior dilated, posterior attenuated, marking along the whole anterior margin of the segments, except on the fifth; posterior margin not contiguous; venter green. Femora black; extreme tip of the femora, tibiæ and tarsi yellow; extremity of the tarsi brown. Wings hyaline, anterior margin yellowish. Length 7 mm.; wing 14 mm.

Cuantla, Mexico (Saussure), Bellardi.

Length ♂ 9 mm.—Face black, with whitish pile; facial tubercle very prominent, obtuse, shining; occiput and inferior orbits obscurely yellow, vertical triangle and a line extending over the vertical angle black; eyes covered with a long whitish pile. Antennæ dark brown. Thorax black, with long, dense, yellowish pile; posterior angle yellowish; scutellum black, sides narrowly margined with yellow, and with yellowish pile. Abdomen with a wide, irregular, dorsal stripe of black, leaving the following yellowish markings; a prominent lateral triangle on the second, third and fourth segments (those on the second and third contiguous, while those on the fourth confined to the posterior angles) and a narrow lateral and posterior margin on the fifth; venter green. Femora black; tip of the femora, tibiæ and tarsi, yellow; the two terminal joints of the tarsi brown. Wings hyaline, veins yellow, discal emits three veins, third longitudinal vein branched.

Texas ♂ (Amer. Ent. Soc.) Waco, Texas ♀ (coll. C. V. Riley), U. S. Nat. Museum.

Bellardi described only the ♀, with which the specimen I have examined agree so well, that I think there is no doubt of its determination.

Odontomyia mexicana n. sp.

Length ♂ ♀ 6 mm. ♂.—Face black, shining, with sparse, whitish pile; oral margins yellow. Antennæ yellow, third joint brownish. Thorax and scutellum black, with whitish pile; spines yellow. Abdomen greenish white, with an irregular black dorsal stripe, consisting of a wide spot on the first, a narrow triangular marking on the second and third, a roundish mark on the fourth, and a small spot at the anterior margin of the fifth; venter greenish white. Legs yellow; femora, except the tip and terminal joint, brownish. Wings hyaline, veins light yellow, discal cell emits three veins.

♀.—Face, front, vertex and occiput, greenish yellow; a transverse line on the vertex, an interrupted line on the front, a line or spot on each side of the antennæ, not reaching the orbits, a spot on each side of the facial prominence and mouth, black. Thorax black; pleuræ and a lateral stripe green, lateral stripe tapering anteriorly; scutellum green. Abdomen greenish, dorsal stripe interrupted, consisting of a small spot on the first, a small spot at the base of the second and third, a larger spot reaching both margins on the fourth, and a small spot at the base of the fifth segment.

Tehuantepec, Mexico (collection C. V. Riley, U. S. Nat. Museum).

This may possibly be the species referred to *O. vertebrata* Say, by Bellardi. I doubt if Bellardi and Say had the same species.

Doubtful and Undetermined Species.

Odontomyia Lefebvrei Macquart.

Odontomyia Lefebvrei Macquart, Dipt. Exot. i, 1, 189.
Odontomyia Lefebvrei Bellardi, Saggio, etc., i, 33.
Stratiomys Lefebvrei Walker, List, etc., v, 10, et 311.

Face vert, un peu créneé á petits spoils blance; antennes; les deux premiers articles verdatres, troisieme noir, à premiere division jaunatre, et les suivantes egalement jaunatres-en-dessous seulement. Thorax noir, a poils jaunatres; cotes et poitrine verts, á poils blanes; écusson vert a base noire pointes vertes, a extremite noire. Abdomen vert a large bande dorsal noire legerement crenelee a chaque segment; un point noir de chaque cote des troisieme et quatrieme, au bord anterieur; ventre vert. Pied vert; cuisses anterieures á extrémité noir; intermediaires et posterieures egalement terminees de noir en-dessus seulement; jambes d'un vert jaunatre, à moitis posterienre noire; tarses noirs; premier article des posterieurs a base jaunatre. Balanciers vert ailes claires, a bord exterieur jaunatre cinq cellules posterieures (Macquart).

Mexico ♂ 5½ l.

♂.—Green and black. Head thick. Thorax broad; eyes naked, contiguous at the base of the front; above minute and below very minutely reticulated; behind black, margined with green; occiput green, maculate; front small, triangular, black, pile yellow; ocelli greenish, first and second joints of the antennæ yellow, third black; face prominent, carinate, green; pile silvery, palpi yellow; proboscis yellow, apex black. Thorax subrotundate, slightly convex, shining, black; pile dense, yellow, a small broad green spot extends from near the base of the wings to that of the scutellum; pleuræ and pectus green, pile white, scutellum green, base black, halteres green, base yellow. Abdomen subquadrate, depressed, green; all the segments with a dorsal stripe, stripe broad, black; sides subregular; anterior margins of segments subdentate, lateral margin of the abdomen with black dots; dots either four, two, or wanting; venter convex, green, pile silvery. Legs greenish yellow; upperside of the apex of the femora marked with black; tibiæ at the apex broadly black; tarsi black, base of the first joint reddish. Wings longer than the abdomen, hyaline, anterior margin yellow.

♀.—Front broad, above black, with obsolete green dots, below green; eyes small, naked, very minutely reticulated, posterior margin thick, green; occiput green, with two black stripes; pubescence on the thorax thin, a broad lateral margin from the humeri to the scutellum green; scutellum totally green. Abdomen broad, black, maculated with green, first segment scarcely maculated near the margins; lateral margin of the second broadly maculated, the anterior and posterior margins of the macula produced, falcated towards the dorsal line; lateral margin of the third and fourth subrotundate, lateral and posterior margins contiguous, and divided at the highest part of the segment; fifth segment immaculate, posterior with a transverse band of green (Bellardi).

Length ♂ 15 mm.; wings 24 mm. ♀ 16 mm.; wings 28 mm.

Mexico (Craveri, Truqui); Orizaba, Toluca (de Saussure),

Odontomyia Truquii Bellardi.

Odontomyia Truquii Bellardi, Saggio, etc., i, 37, tab. 1, fig. 11.

"Black and green. Head broad, front broadly black, above with two green spots, below green; ocelli brownish; occiput green, with obsolete, lateral, brown marks; eyes small, bare, minutely and regularly reticulated, posterior margin thick, green; first and second joints of the antennæ brown, third black; face green, shining, carinate, white tomentose on the middle, thin, subnaked; palpi greenish white, proboscis yellow, apex black. Thorax black, with thin, short, golden pubescence; lateral margin from the humeri to the scutellum with a broad green stripe; pleuræ and pectus green, pile white; scutellum totally green, spines yellow, halteres green, base yellowish. Abdomen broad, depressed, black maculated with green; first segment near the margins scarcely marked, second broadly marked, lateral margin contiguous, anterior and posterior margins produced, the appendix round towards the elongated median line, third and fourth with a subquadrate macula, lateral and posterior margins contiguous, fifth with a posterior margin; venter green, with very short, silvery tomentum. Legs green and brown, base of the femora green, near the apex, and especially on the upperside, brownish; base of the tibiæ and base of the first joint of the tarsi broadly brownish; apex of the tibiæ and tarsi black. Wings hyaline, anterior margin yellowish, base brownish. Length 16 mm.; wings 28 mm." (Bellardi)

Cuernavaco, Mexico (Truqui). Collection of Bellardi.

"Allied to the preceding [*O. Lefebvrei*,] but distinguished by the first antennal joint being brown, large macula on front, and the figure of the marking on the second segment, quadrate markings on the third and fourth segments and the femora, being spotted with brown." (Bellardi)

This is certainly very close to *O. binotata* Loew, and may prove to be that species; if so, it has priority.

Odontomyia prasina Jaennicke.

Odontomyia prasina Jaennicke, Neue. Exot. Dipt. 16 (in the Abhandl. d Senckenb. Ges. vol. vi).

♂.—Green, thorax black, with yellowish pilose. Abdomen with a black stripe and two lateral black dots. Antennæ black. Length 13 mm.

Mexico. "This species stands very close to *O. Lefebvrei* Macq. (Dipt. Exot. i, 189); it is, however, distinguished from the same as follows:

"1. The first two antennal joints are black, and the second is, at the base and at the tip, clear brownish red; the third joint is black above, beneath clear brownish red.

"2. The thorax above is covered with fox-red pubescence.

"3. The femora are entirely yellow without black markings, otherwise everything as in *O. Lefebvrei* Macq., Mus. Darmst." (Jaennicke).

Odontomyia affinis Bellardi.

Odontomyia affinis Bell., Saggio, etc., i, 35; tab. i, 12.

♀.—Black and yellow. Head broad, front broadly black above, below yellow, with two black, arcuate stripes. Antennæ black, second joint yellow; face prominent, carinate, yellow; pile white, obsolete; palpi yellow, apex brown, proboscis towards the extremity black; eyes small, bare; posterior margin broadly yellow; occiput yellow, binotated with chestnut. Thorax black, yellow tomentum, posterior marked with green; pleuræ and pectus greenish yellow, pile yellow; scutellum totally green, spines yellow, halteres green, base yellow. Abdomen rather long, depressed, with a broad, continuous, medial, black stripe; margins subparallel, anterior angles of the third and fourth segments with a lateral black dot; venter yellow, immaculate, bare. Legs yellow; femora, tibiæ and first joint of the tarsi yellow; apex of the tibiæ and first joint of the tarsi and all of the other joints of the tarsi, black. Wings hyaline, anterior margin brownish (Bellardi).

Length 13 mm.; wings 23 mm.

Puebla, Mexico (de Saussure). Collection of de Saussure.

Odontomyia dissimilis Bellardi.

Odontomyia dissimilis Bell., Saggio, etc., i, 35; tab. i, figs. 13, 14.

♂.—Black, maculated with yellow. Head small; eyes naked and contiguous at the base of front, above minute, and below very minutely reticulated; front and occiput black; ocelli pale. Antennæ short, black; face scarcely prominent, carinate, black yellow pile; epistoma maculate with yellow near the sides. Thorax slightly convex, black, immaculate, yellow pile; pleuræ and pectus black, golden-yellow pile; scutellum black, margined with yellow; halteres light yellow, base brown. Abdomen elongate, depressed, light yellow, with dorsal stripe, stripe black, irregular, first segment totally black; markings on the second and third segments broad, posteriorly attenuate; fourth subquadrate; fifth subtrapezoidal; venter yellow, base with two black spots. Legs black and yellow; base of the femora broadly black, apex yellow; tibiæ yellow, apex brown; tarsi blackish, base of the first joint yellow. Wings hyaline, near the anterior margin scarcely yellow.

♀.—Front broad, yellow, with three black, transverse stripes, first on the vertex, third at the base of the antennæ and towards the face acutely dentate, second intermediate, arcuated in the middle; posterior margin of the eye light yellow; pubescence on the thorax very short, golden, marked with yellow on the posterior margin between the base of the wings and scutellum; pleuræ light yellow, pectus black. Abdomen black, lateral and posterior margins of the segments yellow, base of the anterior femora narrowly black, posterior brown, scarcely marked with black (Bellardi).

Length 11 mm.; wings 18 mm.

City of Mexico (Truqui). Collection Bellardi.

Odontomyia quadrimaculata Bellardi.

Odontomyia quadrimaculata Bell., Saggio, etc., i, 37, tab. i, 15.

♂.—Black, with reddish yellow marking and yellow pile. Head small, eyes pubescent and contiguous near the base of the front; front small, ocelli pale. Antennæ short, black; face prominent, black, shining, pile yellow; proboscis black. Thorax, pleuræ, pectus and scutellum black, pile yellow; spines of the

scutellum short, yellowish; halteres yellow. Abdomen broad, short, suborbicular, depressed, black; third and fourth segments near the angle of the lateral and posterior margins marked with reddish yellow, margins of the fifth segment reddish; venter reddish yellow; base and inferior vitta of femora black; apex of the femora, the tibiæ and tarsi reddish yellow; apex of the tarsi brown. Wings hyaline, anterior margin yellowish (Bellardi).

Length 7 mm.; wing 14 mm.

Mexico (Craveri). Collection of Bellardi.

Odontomyia femorata Bellardi.

Odontomyia femorata Bell., Saggio, etc., i, 37.

♀.—Black, marked with yellow; tomentum yellow; front broad, black, with a transverse stripe and two dots near the base of the antennæ yellow; first and second joints of the antennæ black, third wanting; face yellowish, with obsolete yellow hairs, strongly produced, middle tuberculate, tubercle marked with brown, margins of the epistoma marked with black; proboscis black. Thorax black, tomentose yellow; lateral margins and posterior macula yellowish; pleuræ yellow, pectus black; scutellum black, with a broad yellow border, spines yellow; halteres yellow. Abdomen depressed, black, tomentose yellow; second, third and fourth segments near the lateral margin yellowish; venter yellow, immaculate. Legs yellow, underside of the anterior and posterior with a short black vitta, apex of the tarsi brown. Wings hyaline. Length 8 mm.; wing 16 mm. (Bellardi).

Toluca, Mexico (de Saussure). Collection de Saussure.

This may possibly be the ♀ of the preceding (*O. quadrimaculata*).

Odontomyia emarginata Macquart.

Odontomyia emarginata Macquart, Dipt. Exot. i, 1, 190.

Stratiomys emarginata Walker, List, etc., v, 40.

Length 4½ l. ♂.—Black. Abdomen yellow, with a broad, biemarginate, black stripe. Face a little prominent, black, with short, white pile. "*Front anterieurement blanc.*" Antennæ black. Thorax entirely black, with short yellow pile; posterior border of the scutellum and spines yellow. Abdomen yellow (perhaps green when living), a large dorsal strip of black, profoundly indentated at the posterior margin of the second and third segments; venter greenish yellow. Legs tawny or brownish, femora more or less black above; tarsi brown; halteres white. Wings hyaline, outer margin slightly yellow, five posterior cells.

Mexico (Macquart).

Odontomyia flavifasciata Macquart.

Odontomyia flavifasciata Macquart, Dipt. Exot. 4e, Suppl. 53.

Length 6 l. ♀.—Black. Abdomen maculated on the sides with yellow; second segment with a yellow band. Face greenish yellow, carinate; front black and prominently separated by grooves in four parts; base yellow. Antennæ, first and second joints testaceous, third black; back of the head margined with yellow. Thorax black, a yellow stripe extends from the anterior to the posterior margin on each side above the insertion of the wings; pleuræ and pectus green, with a long yellow spot; pile yellow; scutellum yellow. Abdomen black; second segment with a large band of greenish yellow interrupted in the middle; third and fourth with an almost square yellow spot on each side; fifth margined with

yellow, first three segments of the venter yellowish, posterior margin of the third black; fourth yellow, with a central spot and posterior margin of black; fifth with four spots on the anterior margin, and the posterior margin yellow. Femora greenish yellow, tips testaceous; tibiæ testaceous, tips of the anterior ones brown, tarsi black, metatarsi testaceous; outer margin of the wings yellow, five posterior cells.

Mexico (Macquart).

Odontomyia rubricornis Macquart.

Odontomyia rubricornis Macquart, Dipt. Exot. Suppl. i, 53.

Antennæ testaceous, apex brown. Thorax bluish black. Abdomen white, dorsal stripe black; posterior legs brown, middle of the femora black.

Length 2½ l. ♂.—Near to *O. viridula*. Face black, shining; front black, with lines. Antennæ dark testaceous, tips black. Thorax bluish black, with a thin white pubescence; margin of the scutellum and spines yellow. Abdomen yellowish white; first, second and third segments with a dorsal stripe of black, enlarged at the two extremities; stripe much more wider on the fourth and fifth segments, but not reaching the sides; venter white, a little brown at the tips of the tibiæ and the joints of the tarsi. Wings hyaline.

Merida, Yucatan.

Odontomyia limbipennis Macquart.

Odontomyia limbipennis Macq., Dipt. Exot. Suppl. ii, 30, 24.

Stratiomys limbipennis Walker, List, etc., v, 39.

"The label in Macquart's hand-writing in Mr. Bigot's collection bears *America* with a query. The query is omitted in the Dipt. Exot. I doubt that this is a North American species" (Osten Sacken).

Odontomyia albomaculata Macquart.

Odontomyia albomaculata Macquart, Dipt. Exot. i, 1, 189.

Stratiomys albomaculata Walker, List, etc., v, 40.

Length 4½ l. ♀.—Thorax black, scutellum red. Abdomen dark blue, maculated with white. Legs black, first joint of the tarsi white. Face even, inclined, tawny, pubescence whitish; front narrow, tawny, back of head tawny. Antennæ tawny, first joint brown, as well as the last division of the third. Thorax black, with a line of whitish pubescence; spine of the scutellum yellow. Abdomen blackish blue, each segment with a lateral whitish spot and pubescence; underside of the body whitish pubescence. Legs black, knees tawny; halteres white. Wings grayish, veins brown, with five posterior cells.

Port au Prince, San Domingo [Hayti], (Macquart).

Odontomyia vicina Macquart.

Odontomyia vicina Macquart, Dipt. Exot. i, 188.

Stratiomys vicina Walker, List, etc., v, 40.

Length 3 l. ♀.—Black. Abdomen green, with a narrow black dorsal stripe, the apex dilated. Resembles *O. viridis*; the first two joints of the antennæ brownish, testaceous, third imperfect; the black stripe of the abdomen narrow on the first three segments, wide on the fourth.

Cuba. Collection of M. Serville (Macquart).

Odontomyia maculifrons Walker.

Odontomyia maculifrons Walker, List, etc., iii, 536.

"Niger, capite viridi, nigro maculato, thorace pectoreque flavo-marginacis, scutello viridi dentibus duabus flavis armato, abdomine flavo, disc nigro, antennis fulvis apice piceis, pedibus flavis, femoribus nigro fasciatus, alis limpidis."

"Head apple-green, full as broad as the chest, smooth, shining, adorned with five pairs of black marks; first pair forming a short band on each side of the eyelets; second pair forming more slender curved bands; third and fifth pairs forming four dots; fourth pair forming two larger spots; eyes and eyelets piceous, the former with a band across the middle; mouth black, feelers piceous, longer than the head; first and second joints tawny, long; first joint shining, third and following joints short; chest black, clothed with tawny hairs, adorned on each side with a yellow stripe, which is narrow in front; breast black, sides yellow; scutellum apple-green, armed with two short, pale yellow teeth. Abdomen yellow, nearly as broad as long, wider, but not longer than the chest; yellow, clothed with long, pale yellow hairs; disc black above, especially on the part. Legs yellow, hips black, a black band on each thigh. Wings colorless; wing-ribs, veins and poisers yellow. Length of the body 2½ lines, of the wings 4 lines" (Walker)

Honduras (Walker).

Odontomyia canadensis Walker.

Stratiomys canadensis Walk., List, etc., v, 310.

"Nigra. Abdomen viride, vitta dorsali nigra, basi dilatata, lateribus angulatis postice rotundata, apicem fere attingente; pedes testacei; alæ limpidæ, ad costam subtestaceæ, venis pallides; halteres testacei, apice pomacei."

"Nearly allied to *S. paroa* male.—Black, proboscis and antennæ black. Thorax clothed with pale hairs; scutellum black, with two black spines. Abdomen green, with a black dorsal stripe, which extends nearly to the hind border; this stripe occupies nearly the whole breadth of the first segment; on the second it decreases in breadth from the fore to the hind border; on the third and on the fourth it has nearly parallel sides, but is broader on the fourth than on the third; on the fifth it is nearly semicircular. Legs testaceous. Wings limpid, with a testaceous tinge along the costa, veins white, testaceous towards the costa; halteres testaceous, with apple-green knobs. Length of the body 3¾ lines, of the wings 7 lines" (Walker).

I should refer this species to *O. virgo* if it were not for "antennæ black" and the scutellum "armed with two black spines."

EXPLANATION OF PLATE III.

Figs. 1–2.—*Stratiomyia barbata* Loew, ♂ ♀.
" 3–4.— " *melastoma* Loew, ♂ ♀.
" 5–6.— " *lativentris* Loew, ♂ ♀.
" 7–8.— " *Bruneri* n. sp. ♂ ♀.
" 9.— " *laticeps* Loew, ♂.
" 10.— " *senaria* Loew, ♀.
" 11 12.— " *badius* Walker, ♂ ♀.
" 13–15.— " *maculosa* Loew, ♂ ♀ ♀.
" 16.— " *normula* Loew, ♀.
" 17–18.— " *norma* Wied., ♂ ♀.
" 19–20.— " *unilimbata* Loew, ♂ ♀.
" 21–22.— " *Meigenii* Wied., ♂ ♀.
" 23–24.— " *apicula* Loew, ♂ ♀.
" 25–26.— " *quarternaria* Loew, ♂ ♀.
" 27–28.— " *discalis* Loew, ♂ ♀.
" 29–32.—*Odontomyia binotata* Loew, ♂ ♂ ♀ ♀.
" 33–34.— " *cincta* Olivier, ♂ ♀.
" 35.— " *arcuata* Loew, ♀.
" 36–37.— " *nigrirostris* Loew, ♂ ♀.

EXPLANATION OF PLATE IV.

Figs. 1–2.—*Stratiomyia constans* Loew, ♂ ♀.
" 3.— " *mutabilis* Fabr., ♂.
" 4–5.—*Odontomyia hieroglyphica* Olivier, ♂ ♀.
" 6.— " *similis* n. sp. ♀.
" 7–8.— " *arcuata* Loew, ♂ ♀.
" 9.— " *dorsalis* Fabr., ♀.
" 10.— " *hydroleonoides* n. sp. ♀.
" 11–12.— " *pilimana* Loew, ♂ ♀.
" 13–14.— " *pilosus* Day, ♂ ♀.
" 15–16.— " *pubescens* Day, ♂ ♀.
" 17.— " *Aldrichi* n. sp. ♂.
" 18.— " *viridis* Bellardi, ♂.
" 19.— " *trivittata* Say, ♀.
" 20.— " *microstoma* Loew, ♂.
" 21–22.— " *flavicornis* Olivier, ♂ ♀.
" 23–24.— " *occipitalis* n. sp. ♂ ♀.
" 25.— " *nigerrima* Loew,? ♂.
" 26–28.— " *vertebrata* Say, ♂ ♂ ♀.
" 29–30.— " *interrupta* Olivier, ♂ ♀.
" 31 35.— " *virgo* Wied., ♂ ♂ ♀ ♀ ♀.

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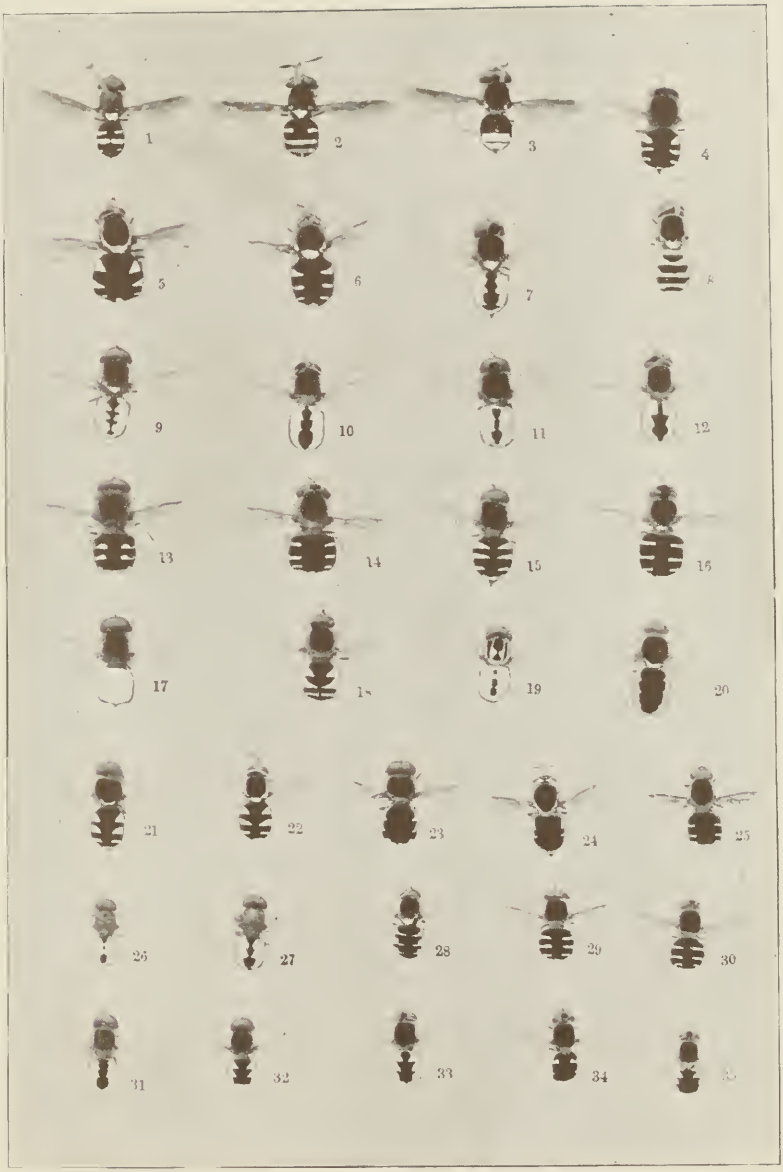
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THE SPECIES OF DINEUTES OF AMERICA NORTH OF MEXICO.

BY CHRS. H. ROBERTS.

The similarity in general appearance of the species of this genus, together with the apparent lack of definite characters for their separation, has not made them favorites with collectors or students. Dr. LeConte monographed the species of the United States, in 1868, in the "Proceedings of the Academy of Natural Sciences of Philadelphia," and described two new ones, *serrulatus* and *carolinus*. In 1878, in the "Proc. Amer. Philos. Society," he described *augustus*. In the "Annals of the Entomological Society of France," 1882 and 1883, Dr. H. Regimbart monographed the species of the world, added one new species, *analis*, to our fauna and suppressed *carolinus* and *augustus* after examining Dr. LeConte's types.

The examination and study of a large series of specimens from all parts of the United has enabled me to recognize all the previously accepted species, and to discover three undescribed. I am also convinced, contrary to Dr. Regimbart's conclusions, that *carolinus* and *augustus* are good species, and I hope by means of the table, descriptions and plates, to make all the species readily recognizable to the student and general collector.

The species are all of fair size, some quite large; all are more or less oval and convex. The upper surface is usually shining and bronzed, and is finely reticulate in all except *sublineatus*, where it is more nearly granulate. The shape of the apices of the elytra and the structure of the anterior tibiæ and femora are the more important characters used to separate the species, but color of the upper and under surface, the distinctness of the striæ and the depressions of the elytra are also of use. The male genitalia afford excellent characters, and the different forms are shown on the plate, but I have not made use of them in the descriptions as the examination of them requires a partial dissection of the specimens. There is a difference in the depth of the thorax, as compared with its width, in some species, but the character does not seem to be of much value. A careful examination of the under surface of the abdomen has failed to show any secondary sexual characters in either male or female,

except in the case of *sublineatus*, which species also shows the peculiar surface sculpture above mentioned. In the female of that species the penultimate abdominal segment is strongly sinuate, giving it the appearance of being lobed at the middle, but the male shows no corresponding character.

The femora of the males in all the species, except *vittatus*, *hornii*, *nigrior* and *assimilis*, are furnished with a more or less distinct tooth, and on the upper surface of the femora of all, male or female, will be found a row of setigerous punctures varying in number and character. A certain amount of discretion is necessary in counting these punctures, as a puncture is occasionally misplaced or entirely lost. When one is missing a corresponding blank space is found, and when there is an extra one it is crowded in close to another, placed entirely out of line or in the hollow of the leg near its base, thus breaking the regularity of the punctuation. The number, taken together with their character, is of value in determining the species.

The depressions in the elytra are situated, one at the exterior apical angle, and the other at the suture near the apex. When the latter is deep the elytra have the appearance of being elevated or humped at that point. In the descriptions the characters of the male are used unless special mention is made of the female, and as a rule the female structure follows closely that of the male; the legs are, however, more slender, and in those species which have the tibiæ subsinuate in shape the broadening is on the outer instead of the inner side; the femora usually have one more puncture.

Four types of anterior tibiæ are represented: first, the truly sinuate, exemplified in *vittatus* and *sublineatus;* second, the subsinuate—cylindrical at basal third, then rather suddenly broadened and continuing nearly parallel to apex—*emarginatus*, *carolinus*, *productus*, *serrulatus* and *analis;* third, the wedge-shaped—rather flat and gradually broadened from base to apex—*hornii*, *nigrior* and *assimilis*; fourth, the club-shaped, somewhat cylindrical at base, not flat, and thence gradually broadened to apex—*discolor* and *augustus*.

The elytra have nine slightly impressed striæ, which are sometimes almost obliterated. The labrum is rounded in front and ciliated, the scutellum is invisible, and the mesosternum is coarsely, but sparsely punctured in front. In the males the anterior tarsi are moderately dilated, and densely clothed beneath with papillæ.

A proper mounting of the specimens is of importance. The anterior legs should be spread out and depressed far enough to allow

of an examination of the upper surface of the femora. The abdomen should be depressed, and care used to see that the elytra are in a natural position; otherwise the serration of the apices may escape notice, and one may be deceived as to whether they are dehiscent at suture or not.

In the measurements that portion of the abdomen extending beyond the elytra is not included, and localities mentioned are those from which I have seen examples.

I wish here to express my deep obligations to Dr. C. V. Riley, through whom were placed in my hands, for examination and study, the large collections of the U. S. National Museum; to Dr. George H. Horn, for advice and the loan of his material; to Wm. Beutenmüller, for a fine series of *serrulatus;* and especially to Prof. John B. Smith, for advice and friendly criticism, and to whose facile pencil the reader is indebted for the plates illustrating this paper.

Were it not for one, *hornii*, the species would divide very naturally into two groups: those with the sutural angles of the elytra rounded, and those with the angles evident and usually produced. In the first section would be placed *vittatus*, *sublineatus*, *emarginatus* and *carolinus*, and in the second all the others. In *hornii* we have a species with the male going into the first, and the female into the second group. Being unable to devise a better arrangement an independent group has been found for the odd species.

The species may be grouped and tabulated as follows:

Sutural angles of elytra rounded in both sexes.....Group A.
Sutural angles of elytra rounded in ♂, produced and strongly dehiscent in ♀.
Group B.
Sutural angles of elytra distinct, frequently produced, in both sexes..Group C.

Group A.

Femora of ♂ not toothed.
Size large; surface very shining: elytra with a bronze vitta.....**vittatus.**
Femora of ♂ toothed.
Size large; opaque, color dark olive: tooth prominent, oblique.
sublineatus.
Size medium to small; surface black, frequently bronzed.
Tooth strong, acute; sutural angles broadly rounded, apices not serrate.
emarginatus.
Tooth weak; sutural angles scarcely rounded, apices finely serrulate.
carolinus.

Group B.

Femora of ♂ not toothed.
Size medium; surface black, not polished, sometimes bronzed.
Anterior tibiæ gradually broadened from base to apex, tip oblique, exterior angles obtuse..... **hornii.**

Group C.

Under surface black, shining, usually bronzed.
Femora of ♂ not toothed.
Size medium, form robust; apices strongly depressed, not dehiscent at suture.
Anterior tibiæ regularly broadened from base to apex, exterior angle acute, produced..... **nigrior.**
Size medium, form more slender; apices not strongly depressed, dehiscent at suture.
Anterior tibiæ regularly broadened from base to apex, exterior angle rectangular..... **assimilis.**
Femora of ♂ toothed.
Size small; apices dehiscent at suture, sutural angles evident, produced.
Anterior tibiæ cylindrical at basal third, then rather suddenly broadened and continuing nearly parallel to apex, exterior angle acute, produced. **productus.**
Under surface brown or testaceous; femora of ♂ toothed.
Apices of elytra serrulate.
Size medium to small; surface very highly polished, not bronzed, strongly narrowed in front; under surface chestnut-brown, serration distinct. **serrulatus.**
Size medium; surface not highly polished, bronzed, moderately narrowed in front; under surface pitchy-brown, serration fine..... **analis.**
Apices of elytra not serrulate.
Size moderately large; broad, narrowed in front, surface metallic shining; under surface and legs testaceous to straw color..... **discolor.**
Size small; narrow, very convex, surface polished black; under surface and legs rufous..... **angustus.**

Group A.

D. vittatus Aubé. Plates v, vi, figs. 1, 1*a* and 1*b*.—Size large, regularly oval, feebly convex; surface black, very shining, obsoletely punctate, striæ faint, more evident at sides; a submarginal bronze vitta extends across the thorax and nearly to apex of the elytra; lateral margins of elytra not sinuate, depressions not deep, sutural angles broadly rounded; under surface dark brown or pitchy, middle and posterior tibiæ and tarsi paler; anterior tibiæ sinuate, apex truncate, or very slightly oblique, exterior apical angle rectangular; femora without tooth, punctures (six ♂, seven ♀) not deep or closely placed. Length 12–15.5 mm.; breadth 8–10 mm.

Hab.—North, Middle and South Atlantic States, Indian Territory, Mexico (one specimen U. S. Nat. Mus.).

Readily recognized on account of its large size, very shining appearance and the bronze vitta.

D. sublineatus Chev. Pls. 5 6, figs. 2, 2*a* and 2*b*.—Size large, oval, rather strongly convex; surface opaque, finely granulate, color dark olive, punctures scarcely visible, striæ well defined; lateral margins of elytra feebly sinuate, depressions scarcely evident in ♂, slightly more so in ♀, apices truncate, of ♀ slightly sinuate, sutural angles feebly rounded; under surface black, middle and posterior legs pitchy brown; anterior tibiæ strongly sinuate, apex oblique, exterior apical angle obtuse; femora of male with a sharp, somewhat oblique tooth, setigerous punctures (9 ♂, 10 ♀) deep and rather closely placed. Length 14 15 mm.; breadth 8–9 mm.

Hab.—Arizona, southward to Nicaragua.

On account of its peculiar color and large size this species will be readily recognized. As mentioned in the introduction, this species has a peculiar secondary sexual character in the female. The penultimate segment of the abdomen is quite strongly sinuate, giving it a lobed appearance, and the ultimate segment has an evident impression at tip.

D. emarginatus Say. Pls. 5, 6, figs. 3, 3*a* and 3*b*.—Size moderate, rather broadly oval, moderately convex; surface black, not very shining, somewhat bronzed, punctures and striæ faint; lateral margins of elytra in ♂ not, in ♀ slightly sinuate at exterior apical angles, depressions not deep, sutural angles broadly rounded; under surface black, very shining and slightly bronzed; middle and posterior legs, tip of ultimate and sides of abdominal segments testaceous; anterior tibiæ cylindrical at basal third, then rather suddenly broadened on inner margin in ♂, on outer margin in ♀, and continued nearly parallel to apex; apex truncate, exterior apical angle rectangular; femora with a distinct, sharp tooth, punctures (7 ♂, 8 ♀) rather deep, not closely placed. Length 10 11 mm.; breadth 6–7 mm.

Hab.—North and Middle Atlantic States; Virginia.

The figure on the plate illustrates an irregular punctuation.

D. carolinus Lec. Pls. 5, 6, figs. 4, 4*a* and 4*b*.—Size small, rather narrowly ovate, moderately convex; surface black, sometimes bronzed, not very shining, punctures and striæ faint; lateral margins of elytra not sinuate in ♂, in ♀ moderately sinuate, impressions scarcely evident, the flattening of the margins extending nearly or quite to the suture, sutural angles feebly rounded, apices finely serrulate; under surface black, shining, somewhat bronzed, middle and posterior tibiæ and tarsi dark testaceous; femora brown; anterior tibiæ cylindrical at basal third, then rather suddenly broadened on inner margin in ♂, on outer margin in ♀, and continued nearly parallel to apex; apex truncate, exterior apical angle acute; femora with a small tooth, frequently scarcely more than an abrupt termination of the ridge on underside, setigerous punctures (7 ♂, 8 ♀) not deep, rather closely placed. Length 9–10 mm.; breadth 5.5 6 mm.

Hab.—South Atlantic States; Louisiana, Texas.

I cannot agree with Dr. Regimbart and others that this species and *emarginatus* are identical. While I cannot recognize the apices

of the elytra, as reflexed, as described by Dr. LeConte, the flattening of the margin continuing to the suture gives them that appearance to a certain degree.

In *emarginatus* the femoral tooth is distinct and strong; in *carolinus* weak, often feeble; sutural angles in *emarginatus* rather broadly rounded; in *carolinus* feebly so; apices of elytra in *emarginatus* smooth; in *carolinus* finely serrulate. This serration is very fine, and to see it requires care, a proper position of the specimen, and that it be *clean*. An examination of a hundred or more specimens found the character constant; *carolinus* is smaller and less broadly oval, and the male genitalia are quite unlike.

Group B.

D. hornii n. sp. Pls. 5, 6, figs. 5, 5*a* and 5*b*.—Size moderate, elongate oval, not strongly convex; surface black, not polished, somewhat shining or bronzed, frequently opaque, striæ and punctures feebly marked, more evident in opaque specimens; lateral margins of elytra in ♂ not sinuate, in ♀ strongly sinuate at exterior apical angles, depressions evident, stronger in ♀; sutural angles in ♂ rounded, in ♀ produced, and with the suture strongly dehiscent; under surface dark brown, shining, slightly bronzed; legs dark testaceous; anterior tibiæ regularly widening from base to apex; apex oblique, exterior apical angle obtuse, but not rounded; femora without tooth, punctures (6 ♂, 7 ♀) not deep or closely placed. Length 10–11 mm.; breadth 5.5–6 mm.

Hab.—North and Middle Atlantic States; Texas. Described from four males and four females.

This species has been mixed with *assimilis*, but the rounded sutural angles of the elytra will readily separate the male. The female is not so easily pleased, but the *strongly* dehiscent apices of the elytra and obtuse angulation of the tibiæ with care will determine it.

I take pleasure in naming this species after Dr. G. H. Horn, as a slight recognition of many favors and kindly interest.

Group C.

D. nigrior n. sp. Pls. 5, 6, figs. 6, 6*a* and 6*b*.—Size moderate, regularly oval, rather convex; surface black, shining, slightly bronzed; striæ and punctures evident; lateral margins of elytra in ♂ slightly sinuate at exterior apical angles, sinuate at apex, sutural angles evident, produced; in ♀ lateral and apical margins strongly sinuate, sutural angles strongly produced; depressions deep, apices strongly depressed, not dehiscent at suture; under surface black, shining, middle and posterior tibiæ and tarsi brownish yellow; femora brown; anterior tibiæ regularly widening from base to apex; apex truncate, exterior apical angle acute, evidently produced; femora without tooth, punctures (9 ♂, 10 ♀) deep and closely placed. Length 10–12 mm.; breadth 6–7 mm.

Hab.—North and Middle Atlantic States; Virginia. Described from four males and four females.

Resembles rather closely *hornii* and *assimilis* in its general appearance, but is larger and proportionately broader than either. It may be separated from the former by the produced exterior apical angles of the anterior tibiæ. It differs also in this respect from *assimilis*, and the apices of elytra are strongly depressed and not dehiscent at suture as in that species.

D. assimilis Aubé. Pls. 5, 6, figs. 7, 7 *dis.*, 7*a* and 7*b*.—Size moderate, oblong oval, distinctly convex; surface black, strongly bronzed, not deeply punctured; striæ usually feebly marked; lateral margins of elytra in ♂ not sinuate, apices feebly sinuate, slightly dehiscent at suture and not strongly depressed, sutural angles feebly produced; in ♀ the lateral margins of the elytra and apices more strongly sinuate and dehiscent at suture, sutural angles produced; under surface black, more or less tinged with brown, very shining, middle and posterior legs testaceous; anterior tibiæ regularly widening from base to apex; apex truncate, exterior apical angle rectangular, scarcely or not at all produced; femora without tooth, punctures (7 ♂, 8 ♀) shallow and not closely placed. Length 10–11 mm.; breadth 5.5–6 mm.

Hab.—North, Middle and South Atlantic States; New Mexico, Colorado, Minnesota, Michigan and Dakota.

As remarked under those species, *hornii* and *nigrior* have been mixed with *assimilis;* their more evident differences may be summarized as follows: *Anterior tibiæ:* in *hornii* with apex oblique, exterior angle obtuse; *nigrior* apex truncate, exterior angle acute and evidently produced; *assimilis* apex truncate, exterior angle rectangular and *scarcely* or not at all produced. *Sutural angles:* in *hornii* ♂ rounded, ♀ produced, and with the suture *strongly* dehiscent; in *nigrior* ♂ and ♀ produced, apices depressed and *not* dehiscent at suture; in *assimilis* ♂ and ♀ produced, apices *feebly* dehiscent at suture. *Setigerous femoral punctures:* in *hornii* few (6 ♂, 7 ♀), not deep or closely placed; in *nigrior* numerous (9 ♂, 10 ♀), deep and closely placed; in *assimilis* moderate (7 ♂, 8 ♀), shallow and not closely placed. The male genitalia are entirely unlike, as shown by the figures on the plate.

D. productus n. sp. Pls. 5, 6, figs. 8, 8*a* and 8*b*.—Size small, ovate, not very convex; surface shining, striæ faint, punctures quite evident; ♂ lateral margins of elytra not sinuate, apices slightly sinuate and dehiscent at suture, depressions not strongly marked, sutural angles produced; ♀ lateral and apical strongly and irregularly sinuate, more dehiscent at suture, depressions deeper and sutural angles more sharply produced; under surface black, strongly bronzed and shining, middle and posterior tibiæ and tarsi and last abdominal segment

rufous; anterior tibiæ cylindrical at basal third, then rather suddenly broadened on inner margin in ♂, on outer in ♀, and continuing nearly parallel to apex; apex truncate, exterior angle acute, produced; femora with a small, sharp tooth, the punctures (6 ♂, 7 ♀) being rather large and deep. Length 9.5—10 mm.; breadth 5.5–6 mm.

Hab.—Texas. Described from two males and two females.

Resembling closely *carolinus*, but quite distinct on account of the sutural angles of the elytra being evidently produced, and the differences in the male genitalia.

D. serrulatus Lec. Pls. 5, 6, figs. 9, 9*a* and 9*b*.—Size moderate to small, very convex, strongly narrowed in front; surface polished black with purplish reflection, shining, not bronzed, punctures and striæ obliterated; lateral margins of elytra slightly sinuate at exterior apical angles, apices truncate, sutural angles evident, depressions moderate, apices distinctly serrate; under surface chestnut-brown, shining; anterior tibiæ cylindrical at basal third, then rather suddenly broadened on inner margin in ♂, on outer in ♀, and continuing nearly parallel to apex; apex truncate; exterior angle obtuse, rounded; femora with a distinct, acute tooth, punctures (9 ♂, 10 ♀) moderately deep and closely placed. Length 9–12 mm.; breadth 5–7 mm.

Hab.—All the specimens I have seen, about one hundred, are from Florida.

A very distinct species and readily recognized. While the variation in size is great, it keeps remarkably true to form.

D. analis Reg. Pls. 5, 6, figs. 10, 10*a* and 10*b*.—Size moderate, broadly oval, narrowed in front; surface shining, not strongly bronzed, striæ faint; ♂ lateral margins of the elytra slightly sinuate at exterior apical angle, apices feebly sinuate and dehiscent at suture, sutural angles evident; ♀ margins more sinuate, apices more dehiscent at suture and sutural angles somewhat produced; depressions not deep, apices finely serrate; under surface dark brown, last segment and middle and posterior femora rufous, tibiæ and tarsi testaceous; anterior tibiæ cylindrical at basal third, then rather suddenly broadened on inner margin in ♂, on outer in ♀, and continuing nearly parallel to apex; apex truncate, exterior apical angle obtuse, rounded; femora with a moderate tooth, setigerous punctures (8 ♂, 9 ♀) deep and closely placed. Length 11–11.5 mm.; breadth 6–6.5 mm.

Hab.—Texas.

Dr. Regimbart compares this species with *emarginatus* and "*americanus*" (*assimilis?*), but to me it seems more closely related to *serrulatus*. It is, however, not so strongly convex as that species, the surface is bronzed, not polished black, the apices of elytra are sinuate and dehiscent at suture, while this is not the case with *serrulatus;* the femoral tooth is weaker, the punctures not so numerous, and the serration of the elytra is finer. Dr. Regimbart overlooked this serration, and, while I have not seen his types, his description leaves no

doubt as to the determination of my specimens, of which I have examined over twenty.

D. discolor Aubé. Pls. 5, 6, figs. 11, 11*a* and 11*b*.—Size moderately large, oblong oval, somewhat convex, narrowed in front; surface metallic shining, very rarely black, punctures and striæ quite distinct; lateral margins of elytra at exterior apical angles and apices, sinuate; depressions very feeble, sutural angles weakly produced; under surface and legs testaceous to straw color; anterior tibiæ cylindrical at basal portion and gradually broadened to apex; apex slightly oblique, exterior angle rectangular, produced; femora with a fairly strong triangular tooth, setigerous punctures (6 ♂, 7 ♀) not deep or closely placed. Length 10.5–13 mm.; breadth 6–7 mm.

Hab.—North and Middle Atlantic States; North and South Carolina, Mexico.

It is rather remarkable that the femoral tooth of the male in this species has been so long overlooked. This is probably due to the generally light color of the under surface and legs, and to the habit of the species of *Dineutes* of folding the legs close to the body. Unless the legs are extended the tooth is concealed.

D. angustus Lec. Pls. 5, 6, figs. 12, 12*a* and 12*b*.—Size small, narrowly ovate, strongly convex, narrowed in front; surface black polished, striæ usually entirely obliterated, at most very faint, punctures evident; lateral margins not sinuate, depressions at suture wanting, at exterior apical angles distinct; sutural angles somewhat produced; entire under surface and legs rufous; anterior tibiæ cylindrical at basal portion and gradually broadened to apex; apex strongly oblique, exterior apical angles acute and sharply produced; femora with a minute tooth, setigerous punctures (4 ♂, 5 ♀) shallow and well separated. Length 9–10.5 mm.; breadth 4.5–5.5 mm.

Hab.—Virginia, Florida.

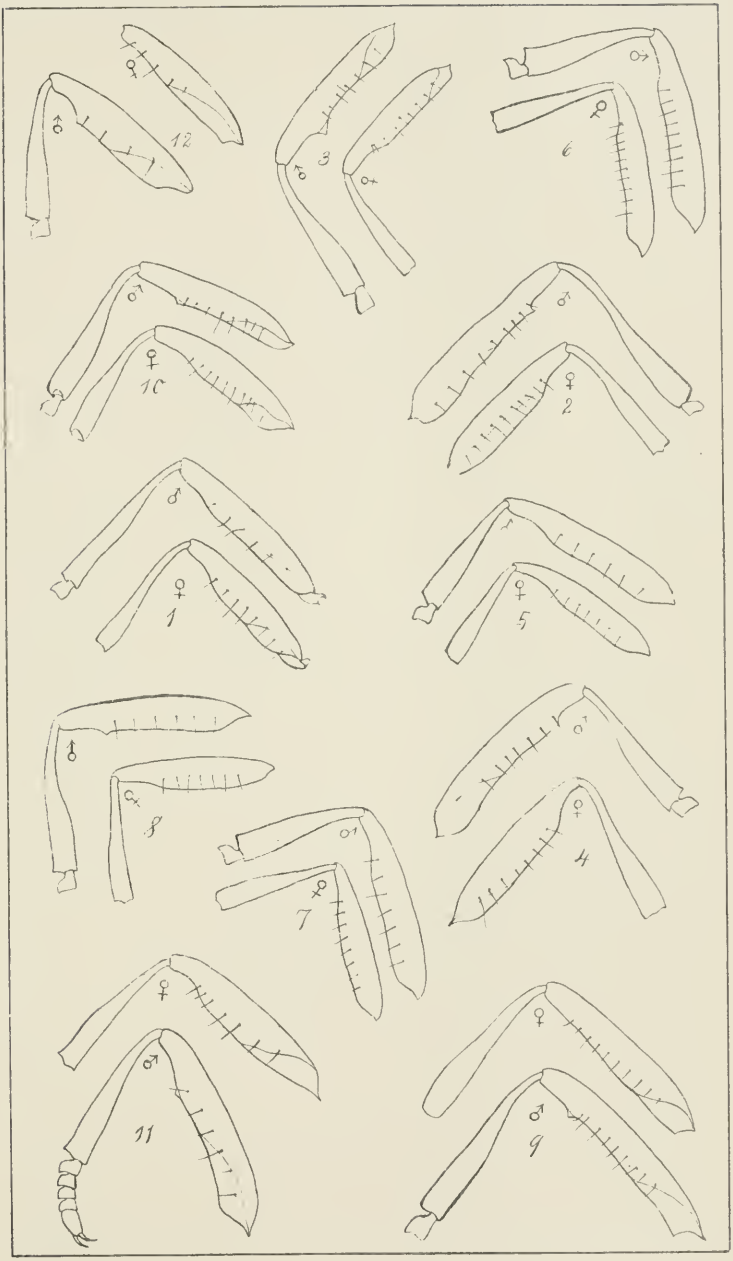
This species is closely related to *discolor*, but I am convinced it is a distinct species. It is smaller, the largest specimens I have seen being no larger than the smallest *discolor*, is narrowly ovate, not so abruptly narrowed in front and more strongly convex. In *angustus* the surface is polished black, in *discolor* metallic shining; in *angustus* the striæ are usually obliterated, never more than very faint; in *discolor* they are distinct; in *angustus* the lateral margins at exterior apical angles are not sinuate, while in *discolor* they are evidently, though not strongly so. There is one less puncture on the femora in *angustus*, and they are more widely separated. While color is not usually a very reliable character, it is sometimes of importance, and in *discolor* I have never seen the entire under surface and legs of a rufous color, which is constant in *angustus*. The male genitalia are very close, being slightly more slender in *angustus*.

The shape of the labrum in *angustus*, which is more prominent than in any other species in the genus, reminds one strongly of *Gyretes*.

EXPLANATION OF PLATES V & VI.

The numbers refer to the same species throughout: *a*, refers to the apices of elytra; *b*, to the genitalia of ♂.

Fig. 1.—*Dineutes rittatus.*
" 2.— " *sublineatus.*
" 3.— " *emarginatus.*
" 4.— " *carolinus.*
" 5.— " *hornii.*
" 6.— " *nigrior.*
" 7.— " *assimilis.*
" 7 *bis*. " " a little distorted by pressure.
" 8.— " *productus.*
" 9.— " *serrulatus.*
" 10.— " *analis.*
" 11.— " *discolor.*
" 12.— " *angustus.*


♀
♂
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DESCRIPTIONS OF NEW HYMENOPTERA.

BY T. D. A. COCKERELL.
(With Notes by W. J. Fox.)

Photopsis picus sp. nov. ♂ 7–10 mm. long, anterior wing 6–7 mm.—Dark honey color; antennæ fulvous. Legs variable, entirely pale ochreous, or dirty straw color, or the four hindmost femora largely blackened. Wings smoky hyaline, *with a large fuscous cloud beyond the marginal cell;* nervures partly brown and partly colorless, *stigma dark brown;* sculpture ordinary; pleura and dorsum of prothorax closely and deeply punctured; mesothorax strongly, but not so closely punctured; metathorax reticulate. Abdomen with first segment finely reticulate, second with numerous broadened shallow punctures; the remaining segments smooth and shiny, becoming punctured below on their distal margins; first joint of flagellum a little longer than second. Head round seen from in front, with the eyes large and black; metathorax rapidly descending, but rounded. Abdomen elongate; the first segment with its anterior half very narrow, *suddenly widening just before its middle* to the bulbous posterior portion, which is rapidly narrowed at its junction with the second segment; genitalia projecting in the form of a *single short spine*, which is slightly curved upwards. *Very slightly more than half of the stigma enclosed in marginal cell:* marginal cell a little shorter than stigma, *abruptly truncate before and behind; two submarginals only;* the first long and narrow, longer than stigma; the second beneath the first, moderately small, triangular, its inferior distal angle a little more than a right angle; the single recurrent nervure entering second submarginal before its middle.

Hab.—Santa Fé, New Mexico (Ckll. 1665, July 25, 1894, and Ckll., 1775, beginning of August, 1894); Las Cruces, New Mexico (E. O. Wooton, September, 1894); San Augustine, New Mexico (Ckll. 2081, Aug. 28, 1894, and three others taken by Prof. Townsend at same place and time); all taken at light. The San Augustine specimens show the whole range of the variation in the color of the legs.

The species allied to *P. picus* are in a considerable state of confusion, and it becomes necessary to enter into some detail in order to make the exact position of the new form clear.

The supposed *mellipes* which ("Ent. News," 1894, p. 200) I compared with *P. territus*, had been so named for me by Mr. Fox, but it turned out that this was a mistake. Thereupon, after comparison with the coll. Am. Ent. Soc. it was labeled *albipes;* but when I wrote Mr. Fox that I could not separate this so-called *albipes* from *nubecula*, he examined the collection and discovered that the

types of *albipes* were missing, and that the specimens (from Colorado) standing in their place were in fact *nubecula*. The original types of *albipes* were from Nevada.

In the meanwhile Mr. Fox kindly sent a specimen of what he considered true *mellipes*, from Arizona. This proved to be the same as what I had labeled *belfragei*, an example having been taken by Prof. Townsend at San Augustine, New Mexico, and another by Miss J. Casad in the Mesilla Valley. Mr. Fox, being informed of this, wrote that *mellipes* Blake, and *belfragei* Blake, were really the same species; *belfragei*, having more than ten years priority, is the correct name.

But we have, from San Augustine (Prof. Townsend) and the Mesilla Valley (Prof. Wooton), also another form, which flies with *belfragei*, and very exactly resembles it, except that it has a black head. This, evidently, is *P. melaniceps* Blake, but I judge it to be only a variety of *belfragei*, which Mr. Fox admits is perhaps the case.

At Santa Fé I caught a *Photopsis* and sent it to Mr. Fox; word came back that it was *P. nokomis*, though small. I regret that I did not study it, as I find among my Santa Fé *Photopsis* no *nokomis*, but only *picus*. However, that *picus* is distinct from *nokomis* cannot be doubted.

Mr. Fox writes: "the color of *nokomis* varies; but the species is easily distinguished from those mentioned above [*nubecula*, etc.] by the shape of first abdominal segment, which is shorter and gradually broadened *from the base;* in the others it is suddenly dilated at about the middle and is much longer. The width of this segment at apex is variable in *nokomis*."

P. picus, on the other hand, has the first segment shaped like that of *nubecula*. If *picus* is held sideways, the abdomen, with the first segment, suggest the body and head of a woodpecker, whence the specific name. So also in *nubecula*, but the segment in *picus* averages slenderer.

The other type is illustrated by *P. clava* Bl., a Texas specimen, of which I have from Mr. Fox. In this the abdomen, with first segment, might be compared to the body and head of a vulture, in the posture with the head depressed upon the shoulders.

Mr. Fox points out the little brushes of hair on the apices of ventral segments 4 and 5 in *nubecula*. These are entirely wanting in *picus*, which can also be distinguished from *nubecula* by its venation.

A question remains as to *albipes*. Mr. Fox suggests that it may perhaps be the same as *nubecula*, though Cresson does not mention the abdominal brushes; or it may, he adds, be the new form *picus*.

It seems to me that in all probability *albipes* is a good species, and I am sure it cannot be *picus*.

The *picus-nubecula-belfragei* group is recognized by the large fuscous cloud, varying in intensity *beyond* the marginal cell. But *albipes* is said to have the marginal cell itself with a fuscous cloud, and nothing is said of any beyond. To further distinguish *albipes* from *picus* are the three submarginal cells, *picus* having never more than two.

The following table will serve to separate the species allied to *picus*, which are found in the Mesilla Valley:

A.—Stigma inconspicuous, very pale yellowish; two submarginal cells and two recurrent nervures.

1. Head concolorous with body.....P. belfragei Blake.
2. Head black.....P. belfragei var. *melaniceps* (Blake).

B.—Stigma brown, conspicuous.

1. Three submarginal cells and two recurrent nervures..P. nubecula Cress.
2. Two submarginal cells and only one recurrent nervure....P. picus Ckll.

A word may be added to the generic name employed, Mr. Fox having proposed to merge *Photopsis* in *Sphærophthalma*. To me, genera are mainly a matter of convenience; and as *Sphærophthalma* is already inconveniently large, it seems suitable to distinguish from it such a series as *Photopsis*, which is easily recognized by its peculiar *facies*, and, moreover, differs from *Sphærophthalma* in being (like *Brachycistis*) strictly nocturnal. It may be that some supposed species of *Sphærophthalma* are really females of *Photopsis*. Thus I found a single specimen at Las Cruces, New Mexico, which Mr. Fox tells me is *Sphærophthalma marpesia* Bl., though small. To me it appears to be the female of *Photopsis concolor*, which is common in the same vicinity. But, as Mr. Fox observes, there is no way of proving this at present, and *S. marpesia* must be held distinct.

Brachycistis perpunctatus n. sp. ♂.—Nearly 6 mm. long, perfectly black, except the dark brown antennæ and tarsi, the ferruginous mandibles, and the lateral margins of the dorsal abdominal segments shining ferruginous in certain lights; the tegulæ are shining black; the large stigma is black, the veins dark brown, the wings quite clear. Antennæ long, first and second joints of flagellum practically equal, the second perhaps a little the longer. Head, thorax and abdomen shining, with sparse whitish hairs, most perceptible on the abdomen; the whole body surface is rather sparsely, but very strongly punctate, the punctures on the mesothorax being very large; the first abdominal segment is large,

high, with its suture with the second constricted; viewed from the side the shape of the first segment may be compared to that of the head of a young chicken; the stigma is, if anything, a little nearer to the base than to the apex of the wing; the marginal cell is excessively narrow and short, and does not reach the costal margin; there are only two submarginals, the first long, the second small and triangular, but still larger than the marginal; it receives the recurrent nervure much before its middle; the intermediate tibiæ are spinose at tip, but there is only one spur, properly speaking; the abdomen is terminated by a single ferruginous spine, curving upwards; the eyes are not precisely round, but suboval

Hab.—"Found drowned" in the college horse-trough, Las Cruces, New Mexico, 1895, one specimen. This is clearly a *Brachycistis*, though there is no trace of a third submarginal cell. It is by this character and the black tegulæ, that it will be known from *B. atratus* (Blake), which it evidently much resembles.

This year, at Las Cruces, *B. elegantulus* has been taken in May, and *B. glabrellus* in April and June.

Oxybelus sparideus n. sp.—Male about 5.5 mm. long, strongly and densely punctured; black with yellow markings; silvery pubescence on cheeks and face; prothorax carinate; scutellum with an obscure longitudinal keel; squamæ large, rounded, subovate, not pointed as in *emarginatus*, but having a small and easily-overlooked lateral spine; spine broad, deeply emarginate, the emargination forming a little less than a right angle; pleuræ with minute, appressed, silvery hairs; first segment of abdomen deeply longitudinally sulcate; apex of abdomen roundly emarginate. Antennæ dark brown, paler beneath; mandibles yellow with black tips; superior border of prothorax very pale yellow; tegulæ and spine rufous; squamæ and an oblique spot anterior to each, yellow; abdominal bands yellow, more or less interrupted in the middle; last segment rufous; femora black, anterior and middle femora with silvery pubescence and their distal ends yellow; tibiæ yellow, posterior tibiæ anteriorly black; tarsi yellow. Wings hyaline, veins piceous.

Hab.—Las Cruces, New Mexico (Ckll. 1966, Aug. 24, 1894).

The specific name is derived from the resemblance which the spine and squamæ present to the tail with hindmost fins of a fish of the genus *Diplodus*, family Sparidæ.

One has to consider the possibility of this being a variety of the ♀ of *O. emarginatus*. I have a ♂ of *emarginatus*, kindly identified by Mr. Fox, which I took in Las Cruces (Ckll. 2436), and it differs in its entirely black prothorax, in the absence of the spots before the squamæ, in the shape of the squamæ and the spine, etc. It would appear from Robertson's description (Tr. Am. Ent. Soc. xvi, 84) that the spots before the squamæ are usual in ♀ *emarginatus*. Robertson says, also, sides of prothorax yellow.

[NOTE.—*O. sparideus* is evidently distinct from *O. emarginatus*—the spine is differently shaped and the body more coarsely punctured.—W. J. F.]

Oxybelus subcornutus n. sp.—Female about 8 mm. long, strongly punctured, but not so closely on abdomen as in *sparideus*. Black, with yellowish white markings; silvery pubescence on face and pleuræ; vertex with a small tubercle, looking something like a fourth ocellus; prothorax carinate; scutellum not carinate, or very feebly and almost invisibly so; squamæ joined in the middle line, each ending apically in a strong curved tooth; spine small, rather broader at end than at base, abruptly truncate; median sulcus of first abdominal segment almost entirely obsolete, or at least very shallow; tip of abdomen truncate, very feebly submarginate. Antennæ black, slightly brownish towards tips; posterior lateral tubercles of prothorax whitish; tegulæ testaceous; squama and spine whitish. Abdomen with the bands yellowish white, interrupted in the middle; femora black, posterior borders of anterior and middle ones mostly white; tibiæ mostly black on one side, the other side of anterior tibiæ rufous, of middle and posterior, white; anterior tarsi rufous; posterior and middle white, the terminal joints darkened. Wings hyaline, veins piceous.

Hab.—Las Cruces, New Mex., Aug. 11, 1894 (C. H. T. Townsend).

This seems very near to *O. cornutus* Rob., and might be a form of the ♀ of that species (Robertson only describes the ♂). In *subcornutus* the ocelli are normally placed, and the spine is truncate, not rounded. The mandibles of *subcornutus* are rufous in middle as in *cornutus*.

Mr. Fox recognized *cornutus* in a Las Cruces specimen formerly sent him, and this circumstance favors the idea of *subcornutus* being a form of the same.

[NOTE.—*O. subcornutus* differs from the ♀ of *cornutus* by the sparser punctuation of dorsulum and abdomen, particularly that of the second ventral segment: in *cornutus* it is covered with coarse, rather close punctures, while in *subcornutus* it is very sparsely punctured. The form of the abdominal markings is different also.—W. J. F.]

Aphilanthops taurulus sp. nov. ♂. Length about 11 mm.; of anterior wing about 8 mm.—Black, with the markings bright lemon-yellow. Head broad and thick; seen from in front broader than high; eyes elongate-oval, parallel, entire, olive-green, further apart from each other than the greatest length of either; ocelli about as far from eyes as the third and fourth joints of antennæ, hind ocelli a little nearer to each other than the length of the third antennal joint. Head pitch-black, strongly punctured on vertex, but with a smooth, shining spot, about as big as an ocellus, some distance behind the ocelli; cheeks and face covered with appressed, shining, silvery hairs; overlapping the base of the mandibles, on each side, it a triangular tuft of reddish hairs, and immediately above this tuft is an obliquely oval, pale yellow spot, rather obscured by the silvery hairs; mandibles reddish at tips, and with a small yellowish white spot externally at the base. Antennæ about as long as the head is high, black, with the end of the scape broadly pale yellow; fourth joint about half as long as third. Thorax black, with the collar, tubercles, tegulæ, transverse band on scutellum and small mark on each side, and transverse band on post-scutellum, lemon-yellow; metathorax truncate; prothorax in front shining, sparsely punctured; mesothorax

strongly and thickly punctured; scutellum and post-scutellum mostly smooth; metathorax rough; pleuræ and sides of metathorax with silvery hairs. Thorax not so broad as head, and not very much greater in bulk. Abdomen hardly as long as head and thorax, shining, but well punctured, suture between first and second segments fairly constricted; color black, with broad lemon-yellow bands on segments 1–5, that on 1 broadly interrupted in the middle, that on 2 narrowly interrupted, the others continuous, those on 3 and 4 somewhat narrowed in the middle; venter with three interrupted bands. Coxæ black, with their tips more or less yellow; femora black, with their distal tips yellow; tibiæ yellow in front and rufous behind on fore legs, middle tibiæ yellow without and lemon within, hind tibiæ yellow without and black within, but wholly yellow at their proximal, and wholly black at their distal ends; tarsi of anterior legs rufous, the others piceous. Wings smoky hyaline, nervures piceous, stigma brown; third submarginal rapidly narrowing to marginal, a deep sinus between them; marginal about as long as first submarginal, narrowly obliquely truncate, with a small stump of a nervure at its tip; first submarginal somewhat longer than second and third combined; second small, nearly half narrowed the marginal, receiving the first recurrent nervure a little beyond its middle; third receiving the second recurrent nervure much before its middle.

Hab.—Las Cruces, New Mexico, June 8, 1894 (Ckll., 872).

The broad head and high-set antennæ have somewhat the aspect of a bull's or buffalo's head, whence the specific name.

The United States species of *Aphilanthops* may be separated thus:

A.—Face with three broad, yellow stripes.....frigidus Smith.
B.—Face without stripes.
1. Legs red; clypeus margined with yellow.....quadrinotatus Ashm.
2. Legs black and yellow.
a. Clypeus yellow.....laticinctus Cresson.
b. Clypeus black.....taurulus Ckll.

Cameron has described two species, *A. marginipennis* and *A. punctifrons* Cam., from Mexico, but they both appear to me to belong to *Eucerceris;* the first mentioned being allied to *E. canaliculatus* Say, though evidently distinct.

Nysson solani n. sp. ♀.—Length about 6 mm., of anterior wing 4¼ mm. Head and thorax black; legs and abdomen except tip, rufous. *Head* seen from above about twice as broad as long, about as broad as thorax; seen from in front transversely oval. Black, strongly rugose punctate, sparsely clothed with appressed white hairs, which, becoming denser, form a conspicuous silvery band on the face bordering each eye, extending to the insertion of the antennæ; clypeus black, with white hairs; mandibles rufous, with blackish tips. Antennæ very dark brown, first joint of flagellum longer than second. *Thorax* black, very strongly rugoso-punctate; anterior portion of prothorax, tegulæ and metathorax rufous, but the last very dark; mesothorax with a faintly indicated median groove; metathorax with a sharp spine on each side. *Legs* rufous, tarsi darker; fourth joint of hind tarsus conspicuously the shortest; spurs at apex of hind tibia black, unequal, the one on the inner side being the longer; hind tibia with

five short, stout spines on its outer edge, of these one is apical, and the interval between the apical and the one before it is conspicuously greater than that between any other two. *Wings* smoky, iridescent; marginal cell subtruncate, more dusky than the rest of the wing; two submarginals only, the normal *second* submarginal being wanting instead of the third; second submarginal distinctly truncate, forming by its junction with the marginal a short-stemmed Y, the arms of which are about equal. *Abdomen* punctate, each segment, except the last, with a silvery band along its inferior margin above and below; first two segments rufous, next three rufous with dorsum blackish, last mostly black.

Hab.—Las Cruces, New Mexico, July 13, 1893, on *Solanum elæagnifolium*.

Mr. Fox, who first recognized this species as new, observes that it is near *O. bellus* Cr., but differs in its finer punctuation of abdomen, and by lacking the yellowish markings on thorax and abdomen. It may be added that its peculiar venation distinguishes it at once from any known North American species.

[NOTE.—It is doubtful in my mind whether the absence of the second submarginal cell is more than an anomalous character. *Nysson bicolor*, of which also but a single specimen is known, possesses but two submarginals, but in that species it is the third, not the second, cell that is wanting. A larger series is necessary to demonstrate the constancy and value of these supposed, at least at the present time, characters. *N. solani* is remarkable for its very strongly serrated hind tibiæ, a character existing in *N. texanus* and *fuscipes*, and which is not present in the species more closely allied to *solani*.—W. J. F.]

Prosopis subtilis Fox in litt. n. sp.—♀ about 6 mm. long, black, with yellow marks on face, prothorax and legs. Head not very broad; thorax nearly twice as long as high, metathorax subtruncate, but with rounded outlines. Head and thorax rather dull, abdomen shiny; punctuation of vertex and dorsulum fine, close and uniform, giving a somewhat granular appearance under a lens of low power; metathorax more rugulose, but not conspicuously so, its middle portion very finely transversely striate; punctuation of abdomen minute, shallow and inconspicuous; sides of face, to a short distance above the insertion of the antennæ, primrose yellow; this yellow commences narrowly at lower margin of eye, and following the edge of the clypeus gradually widens, reaching its greatest width a short distance below the antennæ, after which it more rapidly narrows again to the eye-margin, just touching the outer edge of the sockets of the antennæ; at its upper termination it does not actually reach the eye-margin, being separated therefrom by a very narrow and short descending tongue of black; the rest of the face is black, except the lower margin of clypeus, which is broadly rufous, with centrally an obscure yellowish spot, whence proceeds upward a suffused rufous tongue; the rufous of the clypeus therefore resembling, in outline, a trefoil leaf, or perhaps rather an inverted T; ends of mandibles shining rufous; flagellum more or less testaceous below, blackish above; hind margin of prothorax narrowly yellow, the yellow interrupted in the middle; tubercles yellow; tegulæ with a yellow spot on anterior, and a subrufous spot on posterior half. Femora black with the extreme tips reddish yellow; anterior tibiæ yellowish in front, black behind; middle tibiæ with the base rather broadly, and the apex

narrowly reddish yellow; posterior tibiæ with more than the basal (proximal) third pale yellow; tarsi yellowish, with a reddish tinge, darkened toward the tips. Wings hyaline, with a slightly dusky tinge; second submarginal very little narrowed toward marginal, rather more than half as long as first submarginal.

Hab. – Las Cruces, New Mexico, on *Solidago*, by the acequia, close to Schaublin's mill, Aug. 24, 1894 (Ckll., 1997), also two other specimens taken on the same day (Ckll., 1971, 1956). The locality of *subtilis* is about two and three-fourths miles from that of *P. bipes*.

Mr. Fox observes that *subtilis* "is evidently new, differing in its subtile sculpture, color of antennæ, and spot at apex of clypeus."

This species and *bipes* were sent to Mr. Fox with a query as to their identity with *P. limbifrons*, but he informs me that they are not that species, and points out that they are certainly also distinct from one another.

Although they present considerable superficial resemblance, careful examination reveals numerous points of difference which cannot be attributed to variation. The following table will assist in their separation:

P. bipes.	P. subtilis.
Size larger, form stouter.	Smaller, more slender.
Punctuation of vertex and mesothorax strong and deep.	Punctuation shallow, and not nearly so noticeable.
Metathorax more rugose.	Metathorax less rugose.
Yellow marks on face resembling human feet.	Marks on face broadly triangular, not resembling feet.
Clypeus entirely black.	Clypeus partly rufous.

Perdita numerata n. sp. ♀.—Length about 5.5 mm.; head and thorax brassy green, abdomen banded pale yellow and black. Head broader than long, inner orbits parallel, clypeus and lower part of sides of face with sparse punctures, vertex finely rugulose; pubescence of head, as also thorax, scattered white; mandibles pale yellowish, rufous at tips; labrum prominent, black; clypeus shaped something like a cocked hat, shiny, dull white, with very conspicuous black marks on its disc, *i. e.*, a pair of broad vertical bars, a little converging above, and not reaching the margin above or below, and a spot without each bar, below the level of its middle, thus ·‖·; small quadrangular patch between upper edge of clypeus and the antennæ, and a more or less triangular patch on each side between clypeus and lower front edge of orbit dull pinkish; the latter pinkish patch extends along orbit about as far as the level of the insertion of the antennæ, but along clypeus only about as far as the black spot; ridge between antennæ distinct. Antennæ above blackish, below yellow, the last joint more or less truncate; collar, tubercles, and a band on upper edge of prothorax broadly interrupted in the middle yellowish white; mesothorax shining, rugulose, very sparsely punctured, median groove distinct; scutellum rather more closely punctured; metathorax bluish-green or bluish, contrasting with the brassy green mesothorax, scutellum and post-scutellum; upper part of metathorax shiny,

appearing microscopically tessellated. Femora black, with pale yellow distal ends; anterior and middle tibiæ pale yellow with a black patch behind; hind tibiæ much longer, with long hairs, and almost all black; anterior and middle tarsi pale yellow, hind tarsi black; tegulæ very pale yellow. Wings fairly ample, hyaline, nervures and stigma piceous, almost black, nervures all very distinct; stigma not at all pale in the middle; marginal cell short, not longer than stigma; second submarginal greatly narrowed above, practically triangular. Abdomen with the first dorsal segment black, with a small, transverse, yellow band, broken centrally and not reaching the sides on the disc; second, third, fourth and fifth segments with their their distal half (or more) black, and the proximal half pale yellow, the bands not united in the middle line, nor conspicuously indented; venter dirty yellow, with a pair of dark oval spots on each segment.

Hab.—Las Cruces, New Mex., May 2, 1895, on *Salix* (Ckll., 2898).

The shape of the second submarginal cell is like that of *P. arcuata* Fox, but *P. numerata* is totally distinct by its face markings from any other species that I know of. The number 11 on the clypeus will at once distinguish it.

DESCRIPTIONS OF NEW HYMENOPTERA.

BY T. D. A. COCKERELL AND J. E. CASAD.
(With Notes by Wm. J. Fox.)

Sphærophthalma wickhami n. sp. ♀.—About 10 mm. long. Head large, a little broader than thorax, quadrate seen from above, subcircular seen from in front; color orange-brown; face and crown strongly punctured, covered with appressed shiny orange-red hairs, with blackish, erect hairs interspersed, the latter longest above the eyes; clypeus with long, pale yellowish hairs; mandibles shiny rufous with black tips. Antennæ brown, blackish towards tips, first joint of flagellum a little longer than second. Thorax orange-brown, punctate, becoming strongly reticulate on metathorax; strongly constricted at sides; margin above the smooth and shiny lateral excavations dentate; pubescence similar to that of head, but not so dense on pro- and mesothorax, but anterior part of prothorax and greater part of metathorax bare; coxæ and femora orange-red, tips of femora blackish; tibiæ and tarsi blackish, more or less covered with pale yellowish shiny hairs; tarsal spines rufous, tibial spurs whitish, minutely ciliate. Abdomen pyriform, first segment broad and sessile, orange-red basally and nearly destitute of hairs, but distal half dorsally covered by dense, appressed, shiny, pale golden hairs; second segment black, finely punctate, with a slight median golden streak on its anterior third; a large squarish, pale golden spot on each side, and a rather broad, median, pale golden fringe on the posterior margin; the last-mentioned fringe occupies about the middle third of the margin of the dorsal portion of the segment, the remaining part of the margin being black, except a small golden patch on the extreme lateral portion; the large pale spots are further from each other than the diameter of either; remaining segments black, heavily fringed with pale golden hairs, except the last, which has the hairs orange-red; ventral surface of abdomen with pale hairs; that of second segment strongly punctate and rufous.

Hab.—Houston, Texas (H. F. Wickham); one specimen.

This species is allied to *S. quadriguttata* Say, which it resembles.

It is, however, smaller, and at once distinguished from Say's species by the broader head, proportionately narrower thorax, and broader first segment of abdomen. There are two, instead of four, pale spots on the second segment, and although this is the case also with a variety of *quadriguttata*, the spots in *wickhami* are placed much further apart than the corresponding (viz. posterior) spots in that species. The metathorax is also more rounded posteriorly in *wickhami* than in *quadriguttata*. The *quadriguttata* used for comparison is from Lincoln, Neb. (Shimek), sent by Mr. Wickham.

Sphærophthalma scævolella n. sp. ♀.—About 5 mm. long. Head very large, quadrate, wider than thorax, ferruginous, clothed above with appressed shining pale golden hairs, with some erect hairs interspersed. Antennæ ferruginous, with the tips becoming fuscous; tips of mandibles black. Thorax small, scarcely longer than the transverse diameter of the head, ferruginous, rugose, with scattered, erect, pale hairs; sides excavate, the excavation smooth and shiny; metathorax obliquely truncate, the hairs on it longer than other parts of thorax. Legs ferruginous, sparsely hairy. Abdomen pyriform, ferraginous, with sparse, shining, whitish pubescence, both erect and appressed; first segment gradually widening, broadly sessile with second; second segment with its posterior (caudad) half blackish, the blackish coloration extending forward in a suffused manner on mid-dorsum, but interrupted on each side by a large, whitish patch or spot situated about the middle of the segment; these spots owe their whiteness to appressed shiny white hairs, situated on a pale ferruginous ground, which is easily seen between them; last segment subfuscous.

Hab.—Las Cruces, New Mexico, May, 1894 (Ckll., 713).

Judging from the description, this may be the western representative of the eastern *S. scævola* Blake, but, as will be seen on comparing the descriptions, it is smaller and differs in color. In its type of coloration it stands somewhat between *ferrugata* and *quadriguttata*, though very different from either.

[Note.—*Scævolella* is not related to *scævola*, as it approaches *S. minutissima* and *canadensis*, species of a widely differing group. It is most closely related to *minutissima*, being somewhat larger, the hind angles of head not so sharp and the metathorax is not denticulated.—W. J. F.]

Sphærophthalma rufosuffusa n. sp. ♀.—About 12 mm. long. Head rounded, reddish brown, becoming blackish on cheeks and occiput, covered with dense, coarse, appressed golden hairs, with a few erect black hairs interspersed; scape of antennæ with golden hairs, flagellum black; mandibles long, blackish with brown bases, with the denticle about twice as far from the tip as in *wickhami*; eyes large, more precisely circular than in *wickhami*. Thorax about as broad as head, pyriform seen from above, quadrate seen from the side, reddish brown, rugoso-punctate, reticulate on metathorax; sides little constricted; pubescence of dorsum of thorax taking the form of three broad transverse bands, the first black, the second golden, the third (more sparse) black; all these colors being modified somewhat by the rufous dermis showing between the hairs. The anterior edge of the golden band is practically straight, whereas its posterior edge is convex. Legs rufous, with sparse, long, pale yellowish hairs; coxæ, ends of femora and tibiæ, and tibial spines black, or nearly so; tibial spurs finely serrate.

Abdomen elongate-pyriform, strongly rugose punctate, rufous marked with black and yellowish; first segment moderately broad, the suture between it and the second constricted, so that the angle between the first and second segments at the side is about a right angle, not a very obtuse angle as in *ferrugata*. In general shape the first segment might be compared with that of *quadriguttata*, having the comparative narrowness which distinguishes that from *wickhami*, but in *quadriguttata* the sides of the segment are flattened after the manner of *ferrugata*, whereas in *rufosuffusa* they bulge just before the suture; second segment shining, lively rufous, with black and blackish markings; a blackish triangle, owing its color to appressed black hairs, has its apex cut off by the anterior border of the segment, and its base about the middle of the segment prolonged at the angles obliquely downward and hindward in the form of a suffused and finely evanescent horn. Looking at the insect with the head downwards, the triangle and its prolongations resembles in form the skull of an ox—or better, a gayal—with the nose cut of and the horns shadowy. Below the base of this triangle the color of the dermis shows as a broad rufous band, with the slightest indication of a dark middle line, such as may sometimes be seen in *ferrugata*; the posterior margin of the segment is broadly black, with a yellowish dot medially; this black margin is replaced at the middle of the sides by a yellowish fringe, which is continued beneath; the third segment, so far as visible, is colored like the black margin of the second, with the central yellowish spot and the yellowish fringe beneath; the fifth and sixth are covered with yellowish or golden pubescence, and the last, as the sixth beneath, is black.

Hab.—Guanajuato, Mexico (Dr. A. Dugès); one specimen.

This species is not very near to anything we have seen. The pale thoracic band, with black above and below, suggests the condition of affairs in *dugesii*; whereas the abdominal markings faintly suggest *quadriguttata*, the portions left rufous corresponding to the four spots of that insect, at least to some considerable extent. If, as was argued when *prunotincta* was described, *dugesii* is derived from more or less hairy types such as *prunotincta*; it appears probable that *quadriguttata* and *ferrugata* represent even a later stage of evolution than *dugesii*, though in a different line which may be indicated by such a species as *rufosuffusa*.

Prosopis asininus n. sp. ♂.—About 5 mm. long; black, with yellowish white markings. Head and thorax strongly punctured; metathorax truncate, rugulose; mandibles strongly bifid; the inferior margin of the clypeus is brown, but otherwise it and the rest of the face below the level of the insertion of antennæ is yellowish white; the yellowish white continues on the sides of the face above the level of the antennæ about as much as the length of the scape, ending in an obtuse point at an angle of about 50°; the face markings, taken altogether, strongly suggest the head of a donkey, with erect ears, hence the specific name; scape broadened, truncate; flagellum dark brown; collar and tubercles yellowish white; tegulæ pale. Femora black, more or less pale at distal ends; tibiæ yellowish white, the four posterior ones ringed with black about their distal halves; tarsi yellowish white, terminal joints brownish. Wings hyaline, nervures and stigma piceous; recurrent nervures uniting with transverse cubitals; second submarginal cell slightly narrowed towards the marginal. Abdomen with the anterior face of the first segment finely pubescent, posterior lateral margins of this segment also finely white pubescent; posterior half of abdomen becoming

more or less brownish and finely pubescent, the pubescence in certain lights producing a slightly silvery appearance.

Hab.—Las Cruces, New Mexico, on campus of Agricultural College, September, 1894 (Ckll., 2404). Type in coll. Am. Ent. Soc.

Prosopis rudbeckiæ n. sp. ♂.—About 5 mm. long; black, with primrose yellow face markings. Head and thorax closely punctured; metathorax more or less rounded, hardly truncate; face, including clypeus, below level of insertion of antennæ primrose yellow, sutures conspicuously black; the yellow extends upward a little way between the antennæ, and on each side of the antennæ remote from the margin of the eye there extends upward a yellow process, which broadens toward its end, the length of this process being not much more than half the length of the scape; scape broadened, truncate, black with an elongated yellow mark on its outer side; spot on tubercles and small spot on tegulæ yellowish. Femora black; anterior tibiæ brownish yellow, dark behind; middle tibiæ black, with the proximal end yellowish; posterior tibiæ black, with the proximal two-fifths pale yellow; tarsi brown, the four posterior ones yellow at their proximal ends. Wings dusky hyaline, nervures and stigma piceous; recurrent nervures uniting with transverse cubitals. Abdomen finely punctured, very finely pubescent; the pubescence on the thorax is sparse, white on pleuræ, tinged with fulvous on dorsum.

Hab.—Santa Fé, New Mexico, July 19, 1894, on *Rudbeckia laciniata* (Ckll., 1563). Type in coll. Am. Ent. Soc.

This seems to be a distinct species, though very similar to *P. antennata*.

Prosopis bipes n. sp. ♀.—About 6.5 mm. long; black, with yellow markings; venter and dorsulum closely and strongly punctured; clypeus rather sparsely punctured; abdomen with fine shallow punctures, not so close as those on dorsulum; metathorax rugose, abruptly truncate, concave centrally, with the upper medial portion strongly longitudinally wrinkled. Legs very lightly clothed with silvery hairs. Abdomen shiny, second segment with a patch of white pubescence on each side along the hind margin, apical segment tufted with silvery hairs; sides of face extending from mouth upward about three-fourths length of eye, collar, tubercles, spot on tegulæ, and basal portions of tibiæ and tarsi, yellow; the yellow on the sides of the face gradually broadens to the insertion of the antennæ, where it is notched, and then continues broad until it ends abruptly. These yellow markings resemble a pair of feet standing on tiptoe, hence the specific name proposed; the heel of each foot is against the socket of an antenna; flagellum brownish beneath; clypeus entirely black; mandibles black. Wings hyaline, nervures and stigma piceous.

Hab.—Las Cruces, New Mexico, on campus of Agricultural College, September, 1894; two specimens (Ckll., 2411, 2412).

Mr. Fox remarks, concerning *bipes*, that it is related to *varifrons* and *affinis*, but distinct; differing by the much greater space between the hind ocelli in comparison to that between them and the nearest eye-margin. He adds, "the punctuation of the dorsulum is not quite so close as in the two mentioned, and in *varifrons* there is yellowish on the pronotum."

ON THE LARVÆ OF SOME NEMATOID AND OTHER SAW-FLIES FROM THE NORTHERN ATLANTIC STATES.

BY HARRISON G. DYAR.

The larvæ of our saw-flies have been much neglected, and the majority of those here described have not been referred to previously in literature, though they were collected at random. They include only those that I have succeeded in bringing to imago. Mr. C. L. Marlatt, of the Department of Agriculture, has kindly determined a number of them.

Pristiphora tibialis Norton.

Larva.—Head whitish, scarcely shining, eye black, mouth brown; a green tint by transparency; width 1.5 mm. Body smooth, not shining, faintly 4-annulated, translucent leaf-green, the pulsating edges of the dorsal vessel forming a geminate white dorsal line, filled in with the darker green blood, the anal end usually touched with crimson; segmental incisures a little folded, forming transverse whitish bands when the segments are retracted; tracheal line evident; thoracic feet clear, moderately spreading, abdominal ones small, present on joints 6-11 and 13.

Last stage.—As before, but the head is shining, with brown dots; body also more shiny; width of head the same as before; the larvæ form brown cocoons in the earth.

Found on the white birch (*Betula papyrifera*), sometimes hiding under the bark, or on the leaves at Keene Valley, New York; also on willow and yellow birch at Jefferson, N. H.

Nematus similaris Norton.

Egg.—The eggs are laid in incisions, solitary under the lower epidermis, the cuts forming semi-circular incisions .8 mm. in diameter.

First stage.—Eating a hole in the leaf; lashing the body when disturbed. Head entirely blackish, almost black, mouth pale, width .4 mm. Thoracic feet large, black except at the joints. Body annulate, shining, translucent whitish; alimentary canal green; a pair of button-like, black anal tubercles; no suranal plate visible; feet on joints 6 11 small, concolorous; on joint 13 rudimentary.

Second stage.—Head pale, shaded with brown, most distinctly in a vertical median and lateral stripe; eye and mouth dark; width .6 mm. Thoracic feet watery, black at base and tip. Body more greenish than before, as the alimentary canal shows plainer; traces of blackish subventral tubercles.

Third stage.—As in the next stage, but the markings on the head are more diffuse and brownish; width .9 mm. Thoracic feet black tipped.

Fourth stage.—Head round, wider than high, clypeus large; width 1.2 mm. Pale greenish, eye black; a narrow blackish line along median suture and right across the clypeus above; a lateral brownish one above and behind the eye. Thoracic feet moderate, abdominal small, on joints 6–11, 13; segments rather obscurely 4-annulate, shining between the annulets, greenish; general appearance not shining, translucent yellowish green, alimentary canal darker, but not contrasting; no marks nor tubercles.

Fifth stage.—As before; width of head 1.5 mm.; anal processes short, cylindric-truncate, brown tipped.

Sixth stage.—Much as before, but the two anterior annulets are obscurely watery; width of head the same; the larvæ enter the earth to form their cocoons.

Food-plant.—Locust (*Robinia pseudacacia*). The larvæ are solitary and eat holes in the leaves or sit on the edge of a leaf, as depicted in the figures copied from Comstock in the Fifth Report U. S. Ent. Com., p. 369.

Nematus mendicus Walsh.

Two species with green females were sent to Mr. Marlatt and determined as *mendicus*. The larvæ are not inquilines, but Mr. Marlatt states that Walsh's conclusions are not improbably founded upon error. Therefore, I will describe the first larva under this name, as it feeds on willow. The other is different, the fly also is considerably larger than *mendicus*, with only very slight brownish black marks on vertex of head and on thorax. I distinguish it below as *N. pinguidorsum*.

Egg.—Laid anywhere on the leaf in semicircular saw-cuts just under the upper epidermis; cuts 1.5 mm. in diameter.

First stage.—Head blackish testaceous, shining, eye and mouth black; higher than the body; width .3 mm Body indistinctly 4-annulate, not very shining, greenish. Thoracic feet and anal prongs blackish; abdominal feet on joints 6–11 and 13.

Second stage.—Head dull testaceous, a blackish longitudinal line at the vertex, one upward from each ocellus; eye black, mouth brown; width .55 mm. Body dull greenish, thoracic feet concolorous; a faint blackish tinge above spiracles and a little on subventral ridge on joints 2–4, pale along dorsal line; posterior portion of the body curved under so as to touch the venter; anal prongs blackish.

Third stage.—Head rounded, flattened before, pale green, faintly brownish tinged; a black longitudinal line over the vertex, reaching top of clypeus; a lateral transverse line over ocellus, not quite reaching vertex; mouth brown; width .9 mm. Body soft, leaf green, a faint blackish dorsal and substigmatal shade line; venter a shade paler. Feet small, green; anal prongs blackish. Body scarcely annulate, not shining; trachæ showing as a white line.

Fourth stage.—Head clear green, marked as before, the marks clouded, not so black as ocelli; an additional patch at apex of clypeus; width 1.15 mm. Body uniform leaf green, not shining, except in the creases of the annulets; feet clear,

no marks; color paler, clearer greenish yellow than before, tracheæ very distinct, white; annulets very obscure; anal prongs with a very faint blackish shade, a few setæ on anal plate.

Cocoon.—At first pale yellow, latter brown, opaque.

Food-plant.—Willow (*Salix*). Found in Central Park, New York, and Plattsburgh, N. Y. I am not certain that I have observed all the stages, but give them as they are in my notes.

Nematus pinguidorsum n. sp.

Third (?) stage.—Eating a hole in the leaf; all green, with marks as in the next stage, but faint; eye black; width of head 1.0 mm.

Fourth stage.—Head greenish, eye black, shining, a dark shade bordering the median suture and a brown one from the ocellus upward; width 1.3 mm. Body translucent, of the color of a solution of chlorophyl; segments 4-annulate, with indications of dusky tubercles on second and third annulets, segmental incisures folded. On each side of the dorsal vessel is a segmentary patch of pale yellow consisting of a collection of fat granules, showing by transparency, present on joints 5–12. Feet on joints 6–11; on the anal plate are two short, brown-tipped projections.

Fifth stage.—As before, the fat-patches very evident, pale yellow, consolidated into distinct spots; end of joint 13 above and below deep reddish; width of head 1.75 mm.

Food-plant.—White birch (*Betula papyrifera*). The larvæ are solitary and rest on the edge of the leaf. Found at Keene Valley, New York.

I do not know the true number of stages of this species.

Nematus dorsivittatus Cresson.

Egg.—Laid in semicircular incisions under the upper epidermis, 1.5 mm. long.

Second stage.—Head testaceous, a brownish shade up from the black eye; width .65 mm. Body pale yellowish, the food showing green by transparency, slightly shining, subannulate.

Third stage.—Head as in the next stage, but pale testaceous; jaws black; width 1.0 mm. Body the same, slightly shining, subannulate.

Fourth stage.—Head greenish, with a slight honey tinge, large, higher than the dorsum; a faint blackish shade runs up not far from the black ocellus which is surrounded by a black spot; mouth brown, a dark mark for antenna; width 1.4 mm. Body subtranslucent poplar-leaf green, not shining, the segments folded; no annulets, or the merest trace. Feet on joints 6–11, 13; anal prongs short, brownish; blackish marks at the base of the clear thoracic feet; tracheal line evident; no tubercles.

Fifth stage.—The same, with same width of head.

Both sexes were sent to Mr. Marlatt and determined as above. Is our species really the same as the Nevada one?

Solitary edge-eaters on poplar at Plattsburgh, N. Y.

The female fly is entirely green, except for the black marks and the legs, which are greenish testaceous.

Nematus luteotergum Norton.

Larva.—Head shining black, sutures of mouth pale; width .85 mm. Feet on joints 6–11 and 13; anal prongs black. Body shining green, yellowish subventrally and on the legs; segments obscurely annulate, all minutely pilose, but no distinct tubercles; a blackish subdorsal shade-band and also blackish on the two parts of the subventral ridge. Thoracic feet and anal plate shaded with dusky black; a medio-ventral series of black patches.

Last stage.—Head shining dark vinous, eye black; minutely pilose; width 1.1 mm. Body shining, sordid greenish, rather dark, shaded more or less with vinous, especially subventrally; segments obscurely annulate, minutely pilose; dorsal vessel a dark band; the subventral ridges show as blackish elevations. Thoracic feet partly, anal plate and prongs largely black.

A female from hybernating pupa was named "*Anmauronematus luteotergum*" by Mr. Marlatt; a pair, male and female, from the same batch of larvæ, but which emerged during the same season, were designated "*Pteronus* n. sp., near *latifasciatus* Cress." This must be simply a case of seasonal dimorphism.

Gregarious edge-eaters on alder (*Alnus*), Keene Valley, N. Y.

Nematus latifasciatus Cresson.

Larva.—Head vinous brown, dotted with brown over the vertex, eye black; width 1.6 mm. Body purplish vinous tinted, a metallic red-green shade over the dorsum, partly produced by the food showing by transparency; segments indistinctly 6-annulate, shining, a lateral black shade band, scarcely noticeable against the metallic shade, supplemented by black patches on the folds around the spiracles, subventrally and on the bases of the legs, the latter distinct against the pale purplish subventral color. Feet all pale, yellowish tinged; abdominal on joints 6 11, 13, small; anal plate and short prongs black; setæ minute, seen with a lens.

Allied to the preceding; solitary or partly gregarious on white birch (*B. papyrifera*) at Keene Valley, New York. Imago the same season.

Nematus ventralis Say.

Eggs (see "Insect Life," i, 36).—In large clusters of flat, semicircular saw-cuts under the lower epidermis, 1 x 2 mm. in size.

First stage.—Head round, shining black; width 0.55 mm. Thoracic feet long, spreading, black except at the joints; segments indistinctly 4-annulate, abdominal feet small, on joints 6 11, 13. Body slightly shining, blackish green, subtranslucent; anal prongs concolorous.

Second stage.—As before. Head .75 mm. wide. Body smooth, greenish black, anal prongs black.

Third stage.—Head shining greenish black; width 1.0 mm.; eyes and jaws black. Body scarcely annulate, smooth, shining, obscure blackish olive, anal fork black tipped. Thoracic feet blackish, marked with black. Body unicolorous, immaculate, or the orange spots of the next stage partly present (another brood).

Fourth stage. Head shining black, the front with four grooves and two dents above the clypens; sutures around the mouth brown; width 1.4 mm. Thoracic

feet large, pale olive, marked with black; abdominal ones small, on joints 6 11, 13, pale green. Body smooth, irregularly 5-annulate, the creases like slight folds; shining blackish olivaceous, with a series of lateral pale orange spots, distinct only centrally. The spots are above the subventral fold on annulets 2 and 3.

Larvæ vary in shade, some are blacker than others, and the orange spots vary in distinctness. The larvæ scratch the leaf with their anal prongs and make a rasping sound.

Fifth stage.—Width of head 1.4 1.6 mm. As before, slaty black, except the feet; lateral orange patches on joints 3–12; the two median annulets have somewhat corneous, dorsal, transverse areas, shining, but concolorous with body. Feet all pale watery. Two days after molting the larvæ began to turn shining and livid with a pale dorsal streak anteriorly and entered the ground to spin their cocoons.

Food-plants.—Found on willow (*Salix babylonica*) in Central Park, New York, and on poplar (*Populus grandidentatus*) at Plattsburgh, N. Y. [The latter produced *lombardas*.]

The characteristic larva of this species has been described in Harris' "Entomological Correspondence," p. 270, and in "Insect Life," i, p. 33, and quoted in the "Fifth Report U. S. Ent. Commission," pp. 524 and 588.

Male flies emerging the same season were determined by Mr. Marlatt as *N. ventralis*, but male from pupæ which had hibernated were named "*Pteronus lombardus* Marlatt MS." I have not as yet bred any females, and suggest the seasonally dimorphic relation of these two forms by showing the apparent identity of the larvæ.

Nematus Marlattii n. sp.

Larva.—Solitary, eating on the edge of alder leaves; sitting on the edge or in a hole, the posterior half of the body curled spirally. Head full at vertex, round, clypeus rounded, distinct: pale, shining, greenish brown, with a clouded, deep black longitudinal patch at the vertex and one laterally over the black eye: clypeus and mouth rather darker brown; width 1.2 mm. Thoracic feet moderate, pale; abdominal ones on joints 6–11, 13; segments moderately 4-annulate, smooth, not shining, subtranslucent leaf-green, dorsal vessel scarcely showing; a broad subdorsal blackish green band, broken into a series of segmental patches, extending down to enclose the spiracles; double subventral ridge also blackish, but distinctly spotted with pale, corresponding to the obsolete tubercles; the subdorsal patches also contain pale spots corresponding to tubercles on annulets 2 and 3, but less distinctly.

Imago.—Length .25 inch., expanse .5 inch.; antennæ nearly three-fourths the length of body. The coloration corresponds with Norton's description of *ventralis*, but the orbits are continuously pale.

A single female was determined by Mr. Marlatt as *N. ventralis* Say, and indeed corresponds closely with the description. However, as the larva is very different, the species must be separate.

Nematus Hudsonii magnus n. sp.

Larva.—Sitting on the edge of a leaf and thrashing the abdomen about when disturbed. Head normal, round, black, sutures paler; width 2.2 mm. Thoracic feet moderate, pale, abdominal ones on joints 6–11, 13, well developed; short black anal spines. Body smooth, shining, faintly 3-annulate, dorsal vessel yellowish; color bluish or leaf-green, with a series of orange-yellow, large lateral blotches on joints 3–12 and numerous black spots as follows: two transverse rows per segment above the spiracles, the anterior of three on each side, the posterior of four, its lower (lateral) one largest; two black patches on the halves of the subventral ridge, the lower posterior one somewhat broken; on joint 13 a large lateral black patch and dorsal suranal blackish cloud.

Imago.—Female: length 9.5 mm. Black, lateral lobes of mesothorax dark brown. Abdomen yellowish ferruginous, except basal plates and extreme tip. Wings hyaline, a faint dusky shading below stigma; posterior angles, labrum and palpi, tegulæ and legs pale, coxæ black at base, posterior coxæ and all the femora largely yellowish ferruginous, apical three-fourths of posterior tibiæ and their tarsi black.

Mr. Marlatt has confirmed my determination that this species is undescribed.

Two larvæ on poplar at Plattsburgh, N. Y.

This rather large fly is named for my friend, Prof. George H. Hudson.

Nematus corylus Cresson.*

Third stage.—As in the next stage, but less green, more sordid yellowish; all shining, subventral black spots distinct, anal plate black, contrasting, contiguous to a small spot below the anus; width of head .7 mm.

Fourth stage.—Head shining black; width 1.0 mm. Body shining green, a little paler than the upperside of the alder leaf; dorsal shading (of the next stage) scarcely indicated, except as a dusky subdorsal shade on thorax, but anal plate black; subventral folds black, forming two black spots per segment, the upper anterior, the lower posterior. Thoracic feet black at base and tip; median ventral black spots present, but abdominal feet concolorous with body; not opaque, the tracheal line visible; setæ on two annulets.

Fifth stage.—Head shining brown, sordid, eye black on a diffuse spot; width 1.4 mm. Body indistinctly annulate. Feet on joints 6–11, small on 11; thoracic feet moderately large. Body long, slender, green, of a dark tint, the spiracular area on each segment faintly discolored, yellowish; dorsal area completely shaded in black, slightly metallic (bronzy); double subventral folds, abdominal feet outwardly and a row of medio ventral dashes black; sometimes a little black stigmatal spot. Thoracic feet pale, marked with black above on joints and claw; anal plate black; setæ minute, dark.

Cocoon.—An oval brown structure at the surface of the ground, as usual in the genus.

Slender, gregarious edge-eaters on alder, with five long, slender, eversible, medio-ventral scent glands, emitting an unpleasant odor,

* These larvæ differ from those described by me under the same name (Can. Ent. xxvi, 44), but perhaps not to a specific degree.

situated posterior to the abdominal feet on joints 6–10. Found at Weld Pond, Franklin County, Maine.

Nematus lateralis Norton* (3E). *Larva.*—Head rather flat before, green, a black shade from ocellus each side nearly to vertex and narrowly in the sutures of clypeus and median suture to vertex; ocellus in a black spot; width 1.4 mm. Body leaf-green, rather dark, slightly shining; feet on joints 6–11, 13, small, concolorous; segments rather indistinctly 5-annulate, with minute, dark, setiferous dots on two central annulets, most distinct on the thorax and subventrally. Body slightly translucent, tracheæ evident, no marks; anal feet absent, but on end of anal plate a pair of colorless short processes with enlarged ends.

Last stage.—As before, but a black shade on clypeus; segments 4-annulate, not shiny, annulets 2 and 3 higher and shiny; no setiferous dots, but minute pile on head and thorax; blackish marks at base of thoracic feet.

Solitary edge-eaters on white birch (*B. papyrifera*), the body not elevated, but bent with the leaf. Found at Plattsburgh, N. Y., and Keene Valley, New York; also in Central Park and along Riverside Drive, New York City, on *B. populifolia.*

Note.—The preceding larvæ are all adapted to rest on the edges of leaves. The two following, however, rest flat on the surface, are slightly flattened, and would be taken for species of *Selandria* at first glance. But their number of legs is normal for the Nematids.

Nematus thoracicus Harrington.

First stage.—Head round, higher than wide, but not narrowing to vertex; shining, eye black, mouth brown; width 0.25 mm.

Second stage.—Similar; eye surrounded by a black spot; head rather higher; width 0.33 mm.

Third stage.—Head almost whitish, pale; width 0.5 mm.; joint 2 small, making the head appear prominent. Body much as in the following stages, but paler.

Fourth stage.—As in the next stage in all points, but a little paler, though darker than in the previous stage; width of head 0.7 mm.

Fifth stage.—Head round, smooth, shining, greenish testaceous, prominent; eye black, mouth brown; width 1.0 mm. Thorax a little enlarged, the feet spreading widely, not concealed. Abdomen slightly tapering posteriorly, gradually becoming smaller from the thorax; feet present on joints 6–11 and 13; segments 4-annulate, smooth, without tubercles, not shining; color pale clear green, the alimentary canal showing dark green, or the surface covered with a slight white bloom. Thoracic feet watery greenish; abdominal ones short, concolorous with the pale subventral region; anal plate rounded.

Sixth stage.—As before; width of head 1.4 mm.

Seventh stage.—Head held forward; light testaceous, faintly brownish, smooth, shining minutely reticulated; eye black, mouth brown; width 2.0 mm.; joint 2

* Identified by Mr. Marlatt, but doubtfully. He says: "3E does not agree altogether in color with this species, but seems to come closer to it than to any other. . . . Since the original type of *lateralis* is lost, it may be as well, perhaps, to describe your specimen as a new species."

depressed anteriorly. All as in the previous two stages; skin smooth, but not shining; at the end of this stage the larvæ fade to a whitish color with a bright green dorsal band and enter the earth without molting.

Cocoon double, the outer layer thin, brown, the inner dark brown, compact, but not very hard; size 4 x 8 mm.

Larvæ found at Woods Holl, Mass., Jefferson, N. H., and at Plattsburgh, N. Y.

Solitary, resting on the venter on the under surface of a leaf; eating only the lower epidermis and parenchyma until nearly full grown, when they eat the whole leaf for a short time. The food-plant is the sugar plum (*Amelanchier canadensis*).

Nematus unicolor Marlatt MS.* (4J). *Larva.*—Head slightly granular, shagreened, a little pilose, pale brownish, pale around mouth, not shining; eye on a black spot; two blackish shades on the back of head behind the vertex; width 1.8 mm. Thorax a little enlarged, its feet spreading; venter flattened; feet on joints 6–11 and 13; subventral region slightly fluted with a few pale setæ; segments not very completely 5- to 6-annulate, segmental incisures folded, not shining, translucent greenish, food giving a dusky tint; subdorsally below the skin a series of emerald-green or pale green granules and streaks, forming a nearly continuous band or even an evident white subdorsal band; tracheal line evident; spiracles pale. When mature the larvæ became pale yellowish with a bright emerald green tint on the thorax and entered the ground.

Cocoon as usual.

Shape and habits of the preceding. Found on the white birch at Keene Valley, New York.

Pœcilosoma inferentia Norton.

Larvæ.—Singly on alder, stretched out flat on the surface of the leaf; smooth, not shining, pale leaf-green, covered with a white bloom; segments 6-annulate. Body slightly largest through the thorax, smaller posteriorly. Thoracic feet not large, just visible from the dorsal aspect; abdominal ones on joints 6–12, 13 posteriorly. Head with a white bloom; eye surrounded by a black spot; width 1.2 mm.; length of larva 18 mm.

Last stage.—No white bloom. Body smooth, slightly shining, pale green, a little yellowish and rather opaque. Head less green, eye black; gradually the larva becomes a translucent waxen pinkish and seeks a place for hibernation.

Found on the alders in Keene Valley, New York, the imagoes the following April.

The two sexes of this fly are very different, and the female has been described by Provancher as *Strongylogaster albosecta*.

Monophadnus barda Say. *Larva.*—Head black throughout, not very shiny, smooth; width 1.6 mm. Feet on joints 6–13; body thick, sides perpendicular; no ridge; segments 6-annulate, the annulets less distinct than the segmental in-

* Mr. Marlatt identifies the fly bred from this larva with specimens from Mt. Hood, Oregon, to which he has given the MS. name of *Pteronus unicolor*.

cisures, smooth, slightly shining; color opaque whitish, with a leaden gray tinge. Thorax, subventral region to spiracles and joint 13 faintly shaded with pale yellow; tracheal line evident; a layer of gray-white pigment seems to lie under the skin like a blanket over the dorsal area nearly down to the spiracles.

Last stage.—Not observed; the larva molted and immediately entered the earth.

Found on a young leaf of ash (*Fraxinus*) at Keene Valley, N. Y.; also on the ash at Rouse's Point, N. Y., in June.

Taxonus multicolor Norton. *Larva.*—Head with a gray lateral patch and one at the vertex, shining; width 1 mm. Thorax a little enlarged, feet on joints 6–13; segments neatly 6-annulate, not at all shiny; color all sordid white with faint traces of a shaded black subdorsal line; food showing faintly by transparency.

Next stage.—Head pale brownish, a large square black patch on the vertex, not reaching the clypeus: a lateral patch; mouth brown; head scarcely shining; width 1.4 mm. Body not shining, with a smoky tinge, a very broad olivaceous black subdorsal band, irregular above; faint blackish marks in impressed spots above the subventral fold. Feet all pale; anal plate transverse, black, not shining; two little pale dots on annulet 1 of joint 2; a brown shade at apex of clypeus.

Last stage.—Width of head the same; translucent and waxy throughout, tinged with vinous and tar-brown, the latter in the folds and on vertex of head. Body shining, smooth, annulate. On acquiring this stage the larvæ enter the ground to construct their hibernation cells.

Sitting flat on the venter on the leaves of the white birch (*Betula papyrifera*); also on the yellow birch (*B. lenta*).

Hylotoma scapularis Klug.

Entirely similar to and indistinguishable from the larva of *H. pectoralis* Leach, which I have elsewhere described. Feeds on the white birch.

Hylotoma cæruleus Norton.

Also indistinguishable from the larva of *H. pectoralis*. Feeds on white birch.

Hylotoma McLeayi Leach (2L). *Larva.*—Head pale greenish yellow, eye and mouth black; a dusky black stripe over vertex and upper part of clypeus; width 1.8 mm. Thoracic feet large, abdominal small, on joints 6–11, 13. Body segments 3-annulate, the obscure shining tubercles greenish, tubercle 1 marked with black on joints 2–4; subventral ridge very prominent, undulate setiferous; color light green, darker dorsally, with a broad, distinct, pale yellow subdorsal band between tubercles 1 and 2; spiracles black, subventral ridge faintly discolored, brownish; all tubercles setiferous; line of tracheæ yellowish.

Cocoon reticular, of yellow silk, at the surface of the ground, as usual in the genus.

Found on black birch at Plattsburgh, and on white birch and mountain ash at Keene Valley, N. Y.; also on *Pyrus arbutifolia* at

Woods Holl, Mass., and on sugar plum (*Amelanchier*), willow and strawberry at Jefferson, N. H.

It will be noted that this larva is widely different from the one described by Norton as *H. McLeayi*, and also from the one which I have recently described under the same name in the "Canadian Entomologist." The latter larva is marked by the letter S in my notes, the present one by 2L. The flies were sent to Mr. Marlatt, who confirms my determination saying "your specimens labeled S and 2L are unquestionably *McLeayi*."

Apparently, in this genus, there are three species produced from one larva (*pectoralis*, *scapularis* and *cæruleus*) and three larvæ which produce one species of imago (*McLeayi*).

I want to call attention to this curious problem in order to induce others to assist in investigating it. I may state that the larvæ which produced *McLeayi* were bred in different years, so that it is highly improbable that there could have been any confusion. Moreover, they were fed in small jars on single leaves, so that other larvæ could not have been accidentally introduced without discovery.

Strongylogaster soriculatus Provancher. *Larva.*—Head whitish, with sordid testaceous tinge, shining, eye black, mouth brown; some with an obscure brownish shade at vertex, or a black patch behind eye and a large one on vertex. Body not shining, whitish waxy, appearing green, except subventrally, from the food showing by transparency; in later stages actually green; segments finely 6–7 annulate; spiracles dark, tracheal line white; feet on joints 6–13.

Found on the common brake (*Pteris aquilina*) solitary, sitting flat on the venter, or on the edge of a leaf. Pupa form in a cell bored in soft wood.

***Strongylogaster annulosus** Norton.

Not distinguished from the preceding and occurring on the same food-plant. Some of the variations above noted and referred to individual differences are probably really of specific value.

***Strongylogaster luctuosus** Provancher.—Head shining whitish with a brown tint, eye and mouth dark; a black shade behind the eye, touching it; a neat, shining, black patch on the vertex, pointed anteriorly and reaching the clypeus, where it enlarges a little; width 2.4 mm. Body neatly annulate, light emerald-green dorsally, waxy whitish on joint 2 anteriorly, joint 13, subventrally and on the feet; last two joints of spreading thoracic feet black tipped; a pair of black patches at base of anal plate, and a series of little orange ones below the black spiracles on joints 3–12. Body slightly shining.

Found with the preceding at Keene Valley, N. Y.; also on *Pteris* at Jefferson Highlands, N. H.

* Determined by Mr. A. D. MacGillivray.

***Strongylogaster pinguis** Norton.

Egg.—Laid in nearly circular saw-cuts under the upper epidermis in the middle of the leaf.

First stage?—Head as in the next stage, but the clypeus entirely black; width .35 mm. (probably an error; .5 is the calculated width), smooth, annulate, the points on joint 2 indicated; subventral region a little scalloped; color pale greenish, food giving a darker shade.

Second stage?—Head conical, high, the apex curiously pointed, blackish brown, pale below; eye black; width .6 mm. (= .7?). Thorax a little enlarged, subventral region protruding, fluted, applied close to the leaf; segments obscurely annulate; feet on joints 6–13; pale green, with an olivaceous tinge, not shining, the whole dorsal region blackish, defined at the lateral edge; a pair of colorless elevated flaps in place of the cervical shield; small black anal points.

Third stage.—Head conical, round-pointed at the apex, sutures indistinct; mahogany red, pale around the mouth; ocellus black; width 1.1 mm. (= 1.0 mm.?). Two conical processes on the first annulet of joint 2 and a single median one just behind them on the third annulet of 2. On joint 13 a small subdorsal point and four such on the edge of the segment posterierly; subventral folds fluted, with pointed concolorous tubercles; segments obscurely 7-annulate with indications of pointed tubercles subdorsally; color not shining, yellowish olivaceous from the food showing through the pale yellowish body; a defined black lateral line, beginning on joint 2 behind the points and ending on joint 13 behind the points there.

Fourth stage.—Head 1.4 mm.; segments 6-annulate; subdorsal points on the second and fourth annulets and six on the subventral fold are distinct; otherwise as before.

Fifth stage.—As before; width of head 2.0 mm.; a blackish cloud at the apex of head.

Sixth stage.—Of the same shape as before, but without any tubercles, all shining sordid yellowish in color without marks. Head a shade more reddish than the body; width as before. The folds of the body have a tarry-brown shade. In this stage the larvæ do not eat, but enter the ground to form cells for hibernation.

On the birch and linden at Keene Valley, N. Y. The larvæ sit flat on the venter on the surface of the leaf, solitary; also on the birch, sugar plum and maple at Jefferson, Highlands, N. H.

These curious larvæ are very unlike most *Strongylogaster* larvæ.

Strongylogaster abnormis Provancher. *Larva.*—Head whitish, upper half gray, except posteriorly; a brown band over the clypeus between the eyes; eye in a black spot; width 1.2 mm. Body segments 6-annulate, smooth, not shining; dorsal area above spiracle, except on joint 13, leaf-green; a dorsal and lateral gray shade, the latter bounding the green area, often faint or absent; subventral region and venter whitish; joint 13 dorsally pale green, contrasting. Thoracic feet moderately large, pale; abdominal ones on joints 6–13; antennæ distinct below eye, pale; minute white points are situated on the second and fourth annulets, one in the anterior row and two in the posterior above the stigmatal line, then two points below it and smaller ones on the substigmatal folds.

Last stage.—Head shining, pale, the upper half and clypeus brown, the marks cut in a reticulate manner with fine pale lines. Body shining, without points,

6-annulate, green to the spiracles, waxy greenish below, marked with tar-brown in the folds; spiracles black. Thoracic feet clear; eye on a black spot. On attaining this stage the larvæ bored in soft wood to pupate.

Sitting flat on the venter or curled spirally on the back of a leaf of the dock (*Rumex*).

Common along West End Avenue, New York City, in the vicinity of unoccupied building lots.

Strongylogaster apicalis Say. *Larva.*—Head large, shining, ocherous, a little brownish on vertex and clypeus; eye in a black spot; jaws black; width 2.2 mm. Feet moderate, abdominal ones the larger, present on joints 6–13; dorsal region not shining, greenish, with a little trace of white bloom, ending in a lateral smoky black line more or less distinct; below this line the venter and legs honey-yellow, a little suffused by white bloom, immaculate, or with dusky black dots on the subventral folds; segments indistinctly 6-annulate, the folds showing as whitish creases. Larva rolls up in a ball and falls off the leaf at the slightest provocation.

Last stage (hibernation).—Shining, annulate, green above, whitish below, with a trace of gray marking laterally at the joining of the colors. Head as before. The larva passes the Winter in a cell in the ground.

Food-plant.—Raspberry (*Rubus*).

Tenthredo Cressoni Kirby. *Larva.*—Head very pale, slightly testaceous, shining, a brown ocherous shade at vertex, cut (under a lens) by three pale lines, the middle one representing the suture; width 2.4 mm.; segments 4–6 annulate, on second and fourth (or first and third) annulets some very minute white points, two on annulet 2, five on annulet 4, the last substigmatal, and another substigmatal on annulet 3; none on the subventral folds. Body not shining, whitish, with a green tinge, varying to pale yellowish green, quite translucent; a shaded subdorsal yellowish band, composed of fat granules lying under the skin, distributed in all the annulets; food not showing greatly, dark; claws of the thoracic feet brown; abdominal feet on joints 6–13. Thorax somewhat enlarged.

Last stage.—Smooth, shining light green, annulate, no tubercles; a row of small, dark, segmentary subdorsal patches; otherwise as before. The larvæ enter the ground and form a cell for hibernation.

Found on the white birch at Keene Valley, sitting on the leaves, curled spirally. Easily drops off if disturbed. The same larva occurred on white birch at the upper limit of its growth below the summit of Mt. Washington, N. H. (about two and a half miles down the carriage road).

Mr. MacGillivray remarks: The specimen does not agree perfectly with Kirby's description, yet it does not seem to depart far enough to consider it a distinct species.

NEW NEUROPTEROID INSECTS.

BY NATHAN BANKS.

Perla trivittata nov. sp.—Length 14 mm. Head fulvous, with a large trilobed black spot above, the upper lobe largest and covering the ocelli, the lower lobes extending toward the antennæ; below a black V-shaped spot with the apex upward. Antennæ and mouth-parts black; a black spot behind each eye; prothorax slightly broader in front than behind, its angles rounded; fulvous, with the side margins very broadly black, a narrow black median stripe, and the anterior margin narrowly black; rest of thorax fulvous, mostly covered with large black spots. Legs fuscous, with a pale yellowish elongate spot in front and behind on all femora and on posterior tibiæ. Abdomen brown, a pale stripe on venter, setæ dark brown. Wings brownish, veins blackish, transversals at end of discal cells nearly opposite, radial sector forked but once, upper fork much more than twice as long as pedicel beyond transversals, three transversals between the postcubiti.

One male, Michigan Agricultural College, Michigan, C. F. Baker collector.

Chloroperla borealis nov. sp.—Length 14 mm. Yellowish; head a little broader than the prothorax, pale yellow, with a dark V-shaped mark connecting the ocelli, two dark spots in front, and a small reddish tubercle each side; palpi blackish, antennæ fuscous, yellowish at base; prothorax short, twice as wide as long, a little broader in front than behind, the angles broadly rounded; pale yellow, the elevated margin blackish, each side a little rugulose and brownish; rest of thorax and the abdomen brown. Legs brownish yellow, a transverse black line at ends of femora; setæ short, yellowish in middle, brownish at ends. Wings greenish yellow, veins of anterior pair, except subcosta and radius, brownish (in one wing there are two transversals beyond subcosta, but one is bent and appears abnormal), transversals at end of discal cells are opposite each other, and the upper fork of radial sector is more than twice as long as the pedicel beyond these, there are five transversals between the cubiti.

One female, Olympia, Wash., April (Trevor Kincaid). A male from Ft. Collins, Colo., is smaller, 10 mm., and the radius is only yellowish toward base, the transversals at end of discal cells are slightly separated, and the forks of radial sector are not quite so long, otherwise it is like the female.

Chloroperla pacifica nov. sp.—Length 10–12 mm. Yellowish, head a little broader than prothorax, pale yellow, ocelli black. Antennæ yellowish, palpi brownish; prothorax short, fully twice as wide as long, the anterior angles moderately prominent, the posterior ones broadly rounded, the side margins distinctly black, within slightly rugulose. Legs pale yellow, with a black transverse line at ends of femora. Thorax yellowish, an oblique black suture on meta- and mesothoracic pleura. Abdomen yellowish. Wings pale yellowish, all veins yellowish, the transversals at end of discal cells are opposite to each other, the upper fork of radial sector is one and one-half times as long as the pedicel beyond transversals; there are four or five transversals between the cubiti.

Three specimens, Skokomish River, Wash., May (T. Kincaid).

Chloroperla imbecilla Say.

A specimen from Olympia, Wash., agrees with eastern examples

of this species. The transversals at end of discal cells are separated, and the upper fork of radial sector is at least twice as long as the pedicel; there are three, sometimes four, transversals between the cubiti.

Chloroperla signata nov. sp.—Length 7.5 mm. Yellow, head slightly broader than prothorax, pale yellow, a black triangular spot connecting the ocelli, another smaller triangular spot below with its apex nearly touching the apex of the upper spot; palpi brownish. Antennæ yellowish; prothorax short, elliptical, pale yellow, with a prominent black median stripe, which is slightly broader behind, and on the front margin twice as broad as in the middle, sides slightly rugulose; meso- and metathorax with an indistinct, median, brown stripe. Legs pale yellowish, tibiæ more brownish. Abdomen yellowish, apex broken. Wings yellowish hyaline, veins in fore wings, except subcosta and most of radius, brown; transversals at end of discal cells widely separated, upper fork of radial sector hardly one and one-half times as long as the pedicel beyond the outer transversal, four transversals between cubiti; some of the veins of posterior wings brownish at tips.

One specimen, Ft. Collins, Colo. (C. P. Gillette).

Choroperla brevis nov. sp.—Length 6 mm. Greenish yellow, head a little broader than thorax, antennæ with basal third yellowish beyond black; prothorax with a fuscous stripe on each side margin, once and one-half as long as broad, barely broader in front, angles rounded, scarcely rugulose; tarsi slightly fuscous. Wings nearly hyaline, with greenish veins, transversals at end of discal cells disjointed, the upper fork of radial sector is not as long as the pedicel beyond these transversals (in one specimen it is just as long), three transversals between the cubiti.

Sherbrooke, Canada (L'abbé P. A. Bégin).

Megalomus mœstus nov. sp.—Length 7 mm. Antennæ a little longer than breadth of wings. Wings quite broad, but over twice as long as broad; margin ciliate, costal area strongly dilated toward base, costal veinlets forked, radius with six branches, the last forked at or before first gradate series; two gradate series, first across middle of wing, indented in middle, second one toward the apex and incomplete. Antennæ, legs and palpi luteous, face pale yellowish, vertex darker. Thorax yellowish, mesothorax brown on each anterior side. Abdomen paler; wings hyaline, veins pale, dotted with black, around the margin groups of veins are alternately black, a broad fuscous band across middle of wing just inside of the first gradate series, several dark patches and an indistinct band beyond the second gradate series; two slender, upcurved, slightly divaricate processes project from the tip of the abdomen.

One female, Santa Fé, New Mexico, July (T. D. A. Cockerell).

Chrysopa coloradensis nov. sp.—Length 15 mm. Face yellow, a broad black stripe under each eye, a curved black line under and on the outside of each antennal socket, very narrow on the outside; vertex green, a black stripe each side behind the eye, pointed in front toward the outer edge of the antennal socket; basal fourth of antennæ black, basal joint yellow, second joint fuscous, rest of antennæ pale yellowish brown. Thorax short, green, broadly margined each side with red; meso- and metathorax green, with a pale reddish stripe each side. Legs green, feet brownish. Wings greenish; pterostigma long, brownish green; fore wings barely pointed, hind wings more distinctly so; in fore wings the lon-

gitudinal veins mostly green, base of first sector and base of cubitus black; the costals, the first series of transversals, the gradate veinlets, and the branches of the anal vein, black; a few of the other veinlets have their ends black; in hind wings the veins, except costals, are mostly greenish.

One specimen, Ft. Collins, Colorado (C. P. Gillette).

Nothochrysa virginica Fitch.

Chrysopa virginica Fitch, i, N. Y. Rept. p. 91.

Nothochrysa phantasma MacGillivray, Can. Ent. 1894, p. 170.

Fitch's species is certainly a *Nothochrysa*, and specimens of Mr. MacGillivray's species (which he kindly sent me), agree with Fitch's description in detail.

Coniopteryx fitchi nov. sp.—Length 2.5 mm. Head yellowish, antennæ brownish with white hair. Thorax yellowish, with four round black spots above. Legs pale yellowish. Abdomen yellowish, more reddish below; wings gray; venation as in *C. vicina*, except that the forks of the second sector are plainly longer than the pedicel (in *C. vicina* shorter than pedicel), the upper fork is curved toward the costa near tip, the vein that connects the first and second fork is almost obsolete (distinct in *C. vicina*), and there is no connecting vein between the cubitus and post-cubitus (distinct in *C. vicina*). Eyes globose, wings not ciliated.

One specimen, Ft. Collins, Colorado (C. P. Gillette).

Panorpa canadensis nov. sp.—Length 11 mm. Reddish, antennæ black, black around ocelli. Legs and abdomen pale yellowish. Wings hyaline; an apical band, broken up on posterior side; a slender, geniculate, pterostigmatical band; a costal middle spot; two spots of a basal band, and a very small basal spot dark brown; wings a little more slender than in *P. debilis*, subcosta extending to pterostigma. Abdomen short; second segment not produced behind; fifth segment of male cylindrical, with a stout projection above; sixth and seventh subequal, sixth with base slender, quite suddenly swollen above and below, seventh gradually enlarging, but not as large as the sixth; eighth short, forceps short, stout, appendages short, not reaching to base of claws.

One male and one female, Sherbrooke, Canada (P. A. Bégin).

Differs from *P. debilis* in smaller size, shorter forceps and appendages, as well as markings.

Panorpa affinis nov. sp.—Length 12 mm. Fulvous, abdomen luteous; wings hyaline, veins fuscous, a slender apical band, an interrupted pterostigmatical one, a middle spot on costa, an interrupted basal band and a basal spot, brown; subcosta runs into costa at middle in the fore wing; the radius does not curve inwardly as much at the pterostigma as in *P. nebulosa*, and the wing is less slender than in that species. Abdomen short, second segment not produced behind; fifth segment tapering, no projection above; sixth and seventh subequal, sixth obconical, curved at base, more swollen above than in *P. nebulosa*, seventh more regularly conical and not so large; eighth short and broad; forceps stout, appendages reaching to base of claws.

One male, Sea Cliff, N. Y. Differs from *P. nebulosa* in shorter, stouter form, more spotted wings, etc.

The species of *Panorpa* known to me from the United States and Canada may be separated by the following table. No species of the genus have been recorded from west of the Rocky Mountains.

1.—Subcosta of fore wings running into costa near middle, plainly before pterostigma, no horn above on fifth segment of male.....2.
Subcosta of fore wings running into costa at the pterostigma.....5.
2.—Wings black, with three narrow white bands.....**lugubris.**
Wings not black.....3.
3.—Large; wings yellow, with three complete black bands.....**rufa.**
Smaller; wings hyaline, no complete bands.....4.
4.—Radial vein curves inward to form pterostigma.....**nebulosus.**
Radial vein nearly straight at pterostigma.....**affinis.**
5.—Wings yellow, three complete brown bands.....**americana.**
Wings more hyaline, two bands more or less interrupted.....6.
6.—Male without horn above on fifth segment; no complete band on wings.
maculosa.
Male with a horn on fifth segment; at least one complete band to wings..7.
7.—Basal band nearly always complete, large species.....**subfurcata.**
Basal band of two spots, smaller species.....8.
8.—Wings flavescent, veins yellow.....**rufescens.**
Wings barely or not flavescent, veins more or less blackish.....9.
9.—Appendages of male not reaching to base of claw of forceps; veins mostly blackish, basal spot very small.....**canadensis.**
Male appendages reaching to base of claw of forceps.....10.
10.—Veins black, basal spot very small; second segment not produced behind.
confusa.
Veins partly yellowish, basal spot larger; second segment produced behind.
debilis.

Rhyacophila pacifica nov. sp.— Length 10–12 mm. Black, with golden hair on face and prothorax; antennæ black, slender, reaching to middle of wings. Legs, except black femora, mostly testaceous, a few small spines on tibiæ and tarsi. Wings blackish, darkest on costa and stigma, a few scattered patches of golden hair, and some golden hairs on the costal margin of hind wings at base; three whitish hyaline dots, one at areulus, one on the veinlet at end of thyridial area, and one on the origin of divisialis; venation as in *R. fuscula*.

Two specimens, Olympia, Wash. (Trevor Kincaid).

Setodes avara nov. sp.—Length 10 mm. Head yellowish, with gray and white hair; palpi densely clothed with gray hair; antennæ cinereous, tips of the joints slightly fuscous. Wings gray hyaline, with gray hair, forming a long fringe on hind margin; five fuscous dots as follows: one at forking of radial sector, one at origin of divisialis, one at forking of divisialis, another at areulus, and a fifth at end of lower branch of divisialis; three transverse gradate veinlets fuscous; upper branch of radial sector forks at the first transverse veinlet; coxæ and abdomen greenish. Legs pale yellowish, with white hairs.

One specimen, Sherbrooke, Canada, June (L'abbé P. A. Bégin). Related to *S. micans*, but easily separated by its more hairy palpi and fuscous dots on the wings.

Philopotamus americanus nov. sp.—Length 9–10 mm. Black, some tawny hairs on head and some on second joint of palpus, also a few on the thorax. Antennæ wholly black, about as long as wings; three distinct ocelli; tips of coxæ pale; hind legs mostly testaceous, hind tibiæ slightly curved and almost twice as long as the femur; spurs 2-4-4. Wings black, more or less thickly spotted with golden, generally following the veins; and four small white spots as follows: a larger basally furcate one before the middle of the wing on the origin of the divisialis, a transverse one at areulus, one at end of thyridial cell, and the fourth at end of thyridial area; but three distinct transverse veinlets in fore wing, one between branches of radial sector, another between radius and upper branch of radial sector, the third in the anal region; upper branch of radial sector forks a little before tip, lower branch forks near base.

Many specimens from a stream near Sea Cliff, N. Y., in December, March and April.

CATALOGUE OF THE COLEOPTERA OF SOUTHWESTERN PENNSYLVANIA, WITH NOTES AND DESCRIPTIONS.

BY JOHN HAMILTON, M. D.,
Allegheny, Pa.

The title of this catalogue as first written was: "The Coleoptera of Allegheny, Pittsburgh and Environs," a very large proportion of all the Coleoptera on the list having been taken in the immediate vicinity of these cities, especially Allegheny. But collections made in many other parts of western Pennsylvania, the contiguous parts of West Virginia and southeastern Ohio, by myself and others, furnished few additional species, and by the insertion of those taken near St. Vincent and in adjacent parts of the Alleghanies (Cambria and Somerset Counties) by Prof. Jerome Schmitt and his assistants, and those by Mr. Henry Klages near Jeannette (both places being in Westmoreland County, eastward from Pittsburgh)—all the Coleoptera known to me to have been taken in western Pennsylvania are included, and this list therefore properly receives the more comprehensive title.

Allegheny, which is destined in the course of time to become an integral part of Pittsburgh, is situated on the right bank of the Allegheny and Ohio Rivers, with a present frontage on the former of two and on the latter of three miles, in latitude 40° 28′, longitude 80° 01′ (Allegheny Observatory). The length of the day at Summer solstice is fourteen hours, fifty-six minutes and fifty seconds. The altitude above sea-level is between 699 feet, city datum, low water level; and Mount Washington 1106 feet; Herron Hill, Pittsburgh, 1259 feet; and Green Tree Hill, three and one-half miles north from Allegheny City Hall, 1339 feet. The facies of the country for many miles on all sides of the rivers is much the same as represented by the city topographies, a series of elevations and abrupt depressions intricately arranged.

The general topography of the region adjacent to the cities is favorable to the existence of a rich and diversified Coleoptera fauna. The Allegheny, arising in New York, flows southwardly till it is met here by the Monongahela flowing northwardly from its source in

extreme southwestern Pennsylvania, Maryland and West Virginia, their union forming the Ohio, which has a northwestwardly flow of twenty-five miles before trending to the southwest.

The Allegheny drains the southern part of western New York and the western slope of the northern Alleghanies, while their central and southern portions in Pennsylvania, Maryland and West Virginia are drained by the Monongahela and its tributaries.

The surrounding country is mainly broken and hilly, indented in every direction by deep valleys, often having very abrupt sides, and through which flow brooks or larger streams. The country is of a similar character eastward to the Alleghanies, of which this region may be considered part of the foot-hills. Thus, as might be expected from the topography outlined, species from the north, from the south and from the mountains all commingle here, as well as the forms which come eastward through the basin of the Ohio.

Only a very small territory has been collected over; more than nineteen hundred of the species listed were taken on the right or western bank of the Allegheny on a strip of ground about ten miles long measuring from the present eastern boundary of Alleghany, and one and one-fourth miles wide, and even this interrupted by five populous boroughs—Millvale, Etna, Sharpsburgh, Aspinwall and Hoboken. No collecting was done in Pittsburgh between the Allegheny and Monongahela. Messrs. William, Henry and Edward Klages, collected extensively on the left or western side of the Monongahela, as was done by myself to a less extent, but less than one dozen species occurred there which were not eventually taken in the Allegheny district. Species however rare in one region, were often abundant in the other, and *vice versa*.

This list must, by no means, be considered as exhaustive of the Coleoptera fauna of this locality. The Scydmænidæ, Trichopterygidæ, Pselaphidæ, Aleocharini, Dytiscidæ, Cryptophagidæ, Lathridiidæ, etc., have scarcely been touched.

The future collector must not expect to take on the territory indicated all of these species; the ruthless hand of improvement is rapidly destroying the primitive features of the locality, and even now many of those must be sought elsewhere that were abundant twenty years ago.

While the foregoing remarks apply to a very restricted locality it must not be inferred that the species occurring there are equally restricted, as in fact they are the common Coleoptera of southwestern

Pennsylvania, though there are probably few localities where so many are concentrated. The higher mountainous regions will doubtlessly furnish some very interesting things descending from the very far northern fauna, and while few of the larger forms are likely to add to this list, close collecting of small species will, without doubt, greatly extend it; the valuable collection notes furnished by P. Jerome Schmitt in connection with the Scydmænidæ and Pselaphidæ show this, and will be appreciated by students of these families.

In this list seventy-two families are represented; of the other ten some species of Stylopidæ, though as yet undetected, certainly occur, while the remaining nine contain each but one genus, and altogether but eighteen species.

The total number of species is 2153, of which 58 are some undetermined and a few undescribed, and in addition there are 49 varieties belonging to species in the catalogue.

Whoever has occasion to compare this catalogue with that of Europe, entitled: "Catalogus Coleopterorum Europæ, Caucasi et Armeniæ rossicæ," 1891 (Cat. No. iv), will find several of the species common to both countries under different generic names. This is sometimes occasioned by a division of a more comprehensive genus, the new genus being used in one catalogue and not in the other. Again, the compilers of this European catalogue seem to have in part adopted an extreme rule of priority by which corrections in orthography or etymology, made even by an author himself are disregarded, and in case of synonyms, according to this scheme, the first name in order of time, however inappropriate, must stand, even when the publications are synchronous (perhaps on the same page) the first name must have precedence. But inasmuch as the law of common sense seems much more ancient than this construction of the law of priority, only the emended names have been admitted to this list. Finally, Geoffroy's superannuated genera have been instated in this European catalogue, but not admitted in this list for the reasons given by Dr. LeConte in the "Canadian Entomologist," vi, 188, etc.

In the subjoined list of discrepancies the first name is that used in this catalogue; the following that in the European.

Bembidium Latreil. (emend)—*Bembidion* Latreil.
Plochionus Dej. (emend)—*Plocionus* Dej.
Tachys nanus—*Tachyta*, a division of *Tachys*.
Silpha surinamensis—*Asbolus* } both untenable (Horn).
Silpha lapponica—*Pseudopeltata* }

Ocypus ater—*Tasgius*, a division of *Ocypus*.
Xantholinus fulgidus—*Eulissus*, a division.
Cilea—*Leucoparyphus*, more recent (Horn).
Cœnoscelis and Typhœa in Henshaw's List (1883) are misprints.
Ips *Fab.* 4-guttatus—*Glisrochilus*, a division of Ips *Fab.*, but Ips *Fab.* is suppressed, and Ips *DeG.* displaces Tomicus *Latreille* in the Scolytidæ.
Tenebrioides Piller (Pall. is probably a misprint)—Tenebroides *Piller*.
Byrrhus murinus—*Porcinolus*, a division of Byrrhus *Linn.*, but Byrrhus *Linn.* is suppressed, and *Byrrhus* Geoff. displaces Sitodrepa, Nicobium, Hadrobregmus, Anobium, etc., in the PTINIDÆ.
DASCYLLIDÆ—*Dascillidæ*, an entomological error.
Corymbites and Ludius—Ludius is the older name, and on account of using a little different scheme of classification the species of the two genera are not separated in Cat. No iv.
Eros—*Dictyoptera* Latrl. ‡ Cat. iv, but Dictyoptera *Latrielle* = Calochromus *Guer.* *Dictyoptera* Latrl. ‡ Cat. iv, and Calochromus are not identical, therefore Eros must stand.
Sitodrepa—*Byrrhus* Geoff.
Orsodacna *Latrl.* (emend.)—*Orsodacne*.
Crepidodera rufipes—*Derocrepis*
C. helixines—*Chalcoides*
C. modeeri—*Hippuriphila*
} Genera of doubtful validity (Horn).
BRUCHIDÆ—*Mylabridæ* Geoff.
Bruchus—*Mylabris* Geoff.
Cistela *Fab.*—*Gonodera* Muls., a more recent name, but Cistela *Fab.* is suppressed and *Cistela* Geoff. displaces Cytilus in the BYRRHIDÆ.
Hypulus *Payk.*—*Dircæa*, a synonym of Serropalpus. *Hypulus* ‡ Cat. iv, is Mystaxis *Kug.* (Horn).
Phytonomus—*Hypera*, a division of Phytonomus.

The genera which concern this catalogue are the only ones discussed. The discrepancies between Henshaw's Lists (1885, 1895) and the European are numerous, but mostly of the above character, and before making any changes in the American the reasons should be thoroughly investigated.

* Denotes species taken by P. Jerome Schmitt and assistants near St. Vincent Monastery, and in the Alleghanies, which did not occur here.

‡ Species taken near Jeannette by Mr. Henry Klages.

CICINDELIDÆ.

Cicindela unipunctata *Fab.*
sexguttata *Fab.*
var. patruela *Dej.*
purpurea *Oliv.*
Cicindela vulgaris *Say.*
repanda *Dej.*
var. 12-guttata *Dej.*
punctulata *Fab.*

CARABIDÆ.

Omophron americanum *Dej.*
Cychrus lecontei *Dej.*
canadensis *Chd.*
‡ elevatus *Fab.*
viduus *Dej.*
ridingsii *Bland.*
andrewsii *Harr.*
Nomaretus imperfectus *Horn.*
Carabus serratus *Say.*
limbatus *Say.*
vinctus *Web.*
sylvosus *Say.*
Calosoma externum *Say.*
scrutator *Fab.*
wilcoxi *Lec.*
frigidum *Kirby.*
calidum *Fab.*
Elaphrus cicatricosus *Lec.*
ruscarius *Say.*
Notiophilus æneus *Herbst.*
semistriatus *Say.*
sibiricus *Mots.*
Nebria pallipes *Say.*
Passimachus depressus *Fab.*
Scarites subterraneus *Fab.*
Dyschirius nigriceps *Lec.*
globulosus *Say.*
hæmorrhoidalis *Dej.*
sphæricollis *Say.*
hispidus *Lec.*
Clivina impressifrons *Lec.*
rufa *Lec.*
americana *Dej.*
bipustulata *Fab.*
Schizogenius lineolatus *Say.*
amphibius *Hald.*
Ardistomis viridis *Say.*
Panagæus fasciatus *Say.*
Bembidium punctatostriatum *Say.*
inæquale *Say.*
nitidulum | *Dej.*
americanum *Dej.*
chalceum *Dej.*
antiquum *Dej.*
nigrum *Say.*
simplex *Lec.*
guexii *Chaud.*
ustulatum *Linn.*
picipes *Kirby.*
Bembidium postremum *Say.*
dentellum *Thunb.*
arcuatum Lec.
postfasciatum *Ham.*
patruele *Dej.*
variegatum *Say.*
intermedium *Kirby.*
versicolor *Lec.*
sulcatum *Lec.*
affine *Say.*
assimile *Gyll.*
4-maculatum *Linn.*
pedicellatum *Lec.*
lævigatum *Say.*
Tachys proximus *Say.*
scitulus *Lec.*
coruscus *Lec.*
lævis *Say.*
nanus *Gyll.*
flavicauda *Say.*
vivax *Lec.*
capax *Lec.*
xanthopus *Dej.*
incurvus *Say.*
nebulosus *Chaud.*
two sp. undetermined.
Pericompsus ephippiatus *Say.*
Patrobus longicornis *Say.*
Myas coracinus *Say.*
cyanescens *Dej.*
Pterostichus adoxus *Say.*
rostratus *Newm.*
vivinctus *Lec.*
unicolor *Say.*
apalachius *Lec.* ms., *Horn.*
diligendus ‡ Lec.
honestus *Say.*
obscurus *Say.*
lachrymosus *Newm.*
coriacinus *Newm.*
stygicus *Say.*
relictus *Newm.*
mœstus *Say.*
sculptus *Lec.*
hamiltoni *Horn*
sayi *Brulle*
lucublandus *Say.*
caudicalis *Say.*
luctuosus *Dej.*

Pterostichus corvinus *Dej.*
tartaricus *Say.*
purpuratus *Lec.*
mutus *Say.*
erythropus *Dej.*
patruelis *Dej.*
femoralis *Kirby.*
Evarthrus sigillatus *Say.*
sodalis *Lec.*
Amara avida *Say.*
fulvipes ‖ *Putz.*
exarata *Dej.*
angustata *Say.*
impunctieollis *Say.*
basillaris *Say.*
cupreolata *Putz.*
fallax *Lec.*
obesa *Say.*
rubrica *Hald.*
musculus *Say.*
Diplochila major *Lec.*
Dicælus dilatatus *Say.*
var. dejeanii *Dej.*
purpuratus *Bon.*
sculptilis *Say.*
ovalis *Lec.*
elongatus *Bon.*
ambiguus *Laf.*
teter *Bon.*
politus *Dej.*
Badister notatus *Hald.*
pulchellus *Lec.*
Calathus gregarius *Say.*
impunctatus *Say.*
‡ Platynus candatus *Lec.*
hypolithus *Say.*
angustatus *Dej.*
decens *Say.*
sinuatus *Dej.*
reflexus *Lec.*
parmarginatus *Ham.*
extensicollis *Say.*
decorus *Say.*
anchomenoides *Raud.*
‡ obscurus *Hbst.*
pusillus Lec.
atratus *Lec.*
melanarius *Dej.*
cupripennis *Say.*
excavatus *Dej.*
Platynus ferrens *Hald.*
nutans *Say.*
octopunctatus *Fab.*
placidus *Say.*
bogemanni *Gyll.*
obsoletus Say.
4-punctatus *Dej.*
æruginosus *Dej.*
crenistriatus *Lec.*
punctipennis *Say.*
retractus *Lec.*
picipennis *Kirby.*
Olisthopus parmatus *Say.*
Atranus pubescens *Dej.*
‡ Leptotrachelus dorsalis *Fab.*
Casnonia pennsylvanica *Linn.*
Galerita janus *Fab.*
Tetragonoderus intersectus *Hald.*
Lebia grandis *Hentz*
atriventris *Say.*
viridis *Say.*
pumila *Dej.*
viridipennis *Dej.*
lobulata *Lec.*
ornata *Say.*
fuscata *Dej.*
scapularis *Dej.*
furcata *Lec.*
bivittata *Fab.*
Coptodera ærata *Dej.*
Dromius piceus *Dej.*
Apristus cordicollis *Lec.*
Blechrus pusio *Lec.*
Metabletus americanus *Dej.*
Plochionus timidus *Hald.*
Pinacodera limbata *Dej.*
platicollis *Say.*
Cymindis americana *Dej.*
pilosa *Say.*
neglecta *Hald.*
Apenes lucidula *Dej.*
sinuata *Say.*
Brachinus americanus *Lec.*
? perplexus *Dej.*
? alternans *Dej.*
? cordicollis *Dej.*
Chlænius erythropus *Germ.*
sericeus *Forst*
laticollis *Say.*
diffinis *Chaud.*

Chlænius platyderus *Chaud.*
æstivus *Say.*
prasinus *Dej.*
leucoscelis *Chev.*
nemoralis *Say.*
tricolor *Dej.*
pennsylvanicus *Say.*
impunctifrons *Say.*
* niger *Rand.*
tomentosus *Say.*
Anomoglossus emarginatus *Say.*
pusillus *Say.*
Brachylobus lithophilus *Say.*
Lachnocrepis parallelus *Say.*
Oodes amaroides *Dej.*
Geopinus incrassatus *Dej.*
Cratacanthus dubius *Beauv.*
Agonoderus lineola *Fab.*
pallipes *Fab.*
var. coma *Fab.*
partiarius *Say.*
pauperculus *Dej.*
Gynandropus hylacis *Say.*
Harpalus dichrous *Dej.*
vulpeculus *Say.*
autumnalis *Say.*
caliginosus *Fab.*
faunus *Say.*
pennsylvanicus *DeG.*
compar *Lec.*
var. erythropus *Dej.*
longior *Kirby.*
longicollis Lec.
megacephalus *Lec.*
spadiceus *Dej.*
fallax *Lec.*
herbivagus *Say.*
Harpalus viduus *Lec.*
basilaris *Kirby.*
Selenophorus palliatus *Fab.*
gagatinus *Dej.*
opalinus *Lec.*
ellipticus *Dej.*
Stenolophus fuliginosus *Dej.*
plebejus *Dej.*
humidus *Ham.*
conjunctus *Say.*
var. with black thorax.
ochropezus *Say.*
alternans *Lec.*
Acupalpus carus *Lec.*
Bradycellus rupestris *Say.*
Tachycellus kirbyi *Horn.*
atrimedius *Say.*
badiipennis *Hald.*
Anisodactylus rusticus *Say.*
carbonarius *Say.*
interpunctatus *Kirby.*
agricola *Say.*
harrisii *Lec.*
nigerrimus *Dej.*
nigrita *Dej.*
melanopus *Hald.*
discoideus *Dej.*
baltimorensis *Say.*
piceus *Lec.*
terminatus *Say.*
agilis *Dej.*
nitidipennis *Lec.*
cœnus *Lec.*
lugubris *Dej.*
sericeus *Harr.*
interstitialis *Say.*

HALIPLIDÆ.

Haliplus ruficollis *DeG.*
Cnemidotus 12-punctatus *Say.*

DYTISCIDÆ.

Hydrocanthus iricolor *Say.*
Laccophilus maculosus *Germ.*
fasciatus *Aube.*
Hydrovatus pustulatus *Mels.*
Desmopachria convexa *Aube.*
Bidessus affinis *Say.*
Hygrotus inæqualis *Fab.*
var. *punctatus* Say.
Cœlambus nubilus *Lec.*
impressopunctatus *Sch.*
Deronectes griseostriatus *DeG.*
Hydroporus concinnus var. pulcher *Lec.*
undulatus *Say.*
vitiosus *Lec.*
niger *Say.*
modestus *Aube.*

Hydroporus stagnalis *G. & H.*
oblitus *Aube.*
oblongus *Steph.*
Hybius biguttatus *Germ.*
Coptotomus interrogatus *Fab.*
Copelatus glyphicus *Say.*
Agabus obtusatus *Say.*
stagninus *Say.*
punctatus *Mels.*
Agabus tæniolatus *Harr.*
Colymbetes sculptilis *Harr.*
Dytiscus fasciventris *Say.*
Acilius semisulcatus *Aube.*
fraternus *Harr.*
Thermonectes basilaris *Harr.*
Graphoderes liberus *Say.*
cinereus *Linn.*
Cybister fimbriolatus *Say.*

GYRINIDÆ.

Gyrinus minutus *Fab.*
ventralis *Kirby.*
? aquiris *Lec.*
Gyrinus analis *Say.*
Dineutes discolor *Aube.*
americanus *Linn.*

HYDROPHILIDÆ.

Helophorus lineatus *Say.*
inquinatus *Mann.*
Hydrochus scabratus *Mals.*
subcupreus *Rand.*
Ochthebius benefossus *Lec.*
* foveicollis *Lec.*
Hydrophilus triangularis *Say.*
ovatus *G. & H.*
Tropisternus lateralis *Fab.*
dorsalis Brulle.
nimbatus Say.
glaber *Hbst.*
striolatus *Lec.*
Hydrocharis obtusatus *Say.*
Berosus striatus *Say.*
Lacobius agilis *Rand.*
Philydrus nebulosus *Say.*
cinctus *Say.*
hamiltoni *Horn.*
Cymbiodyta fimbriata *Mels.*
blanchardi *Horn.*
Hydrobius fuscipes *Linn.*
globosus *Say.*
Creniphilus *monticola *Horn.*
despectus *Lec.*
subcuprens *Say.*
digestus *Lec.*
Cercyon unipunctatus *Linn.*
ocellatus *Say.*
prætextatus *Say.*
indistinctus *Horn.*
analis *Payk.*
hæmorrhoidalis *Fab.*
pygmæus *Ill.*
melanocephalus *Linn.*
lugubris *Payk.*
granarius *Er.*
navicularis *Lec.*
pubescens *Lec.*
Cryptopleurum minutum *Fab.*
vagans Lec.

LEPTINIDÆ.

Leptinus testaceus *Mull.*

SILPHIDÆ.

Necrophorus orbicollis *Say.*
americanus *Oliv.*
marginatus *Fab.*
pustulatus *Hersh.*
tomentosus *Web.*
Silpha surinamensis *Fab.*
‡ lapponica *Hbst.*
inæqualis *Fab.*
Silpha noveboracensis *Forst.*
americana *Linn.*
Pinodytes cryptophagoides *Mann.*
hamiltoni *Horn.*
Choleva simplex *Say.*
basillaris *Say.*
clavicornis *Lec.*
terminans *Lec.*

Prionochæta opaca *Say.*
Ptomophagus consobrinus *Lec.*
parasitus *Lec.*
* brachyderus *Lec.*
* Colon sp.
Colenis impunctata *Lec.*
Liodes globosa *Lec.*
Liodes polita *Lec.*
discolor *Mels.*
basalis *Lec.*
obsoleta *Horn.*
Agathidium oniscoides *Beauv.*
exiguum *Mels.*
politum *Lec.*

SCYDMÆNIDÆ.

This family and the Pselaphidæ have been collected by P. Jerome Schmitt, of St. Vincent College, Westmoreland County; those taken here are marked with a †.

Euthiodes cristata *Brend.*
† Cephennium corporosum *Lec.*
† Cholerus zimmermanni *Schaum.*
Eumicrus notschulskii *Lec.*
caseyi *Brend.*
n. s.
† Brachycepsis subpunctatus *Lec.*
mariæ *Lec.*
n. s.
cribrarius *Lec.*
† Scydmænus fossiger *Lec.*
Scydmænus † capillosus *Lec.*
† basalis *Lec.*
hirtellus *Lec.*
analis *Lec.*
brevicornis *Lec.* (*Say*).
† clavatus *Lec.*
† clavipes *Lec.* (*Say*).
† lecontei *Schauf.*
fulvus *Lec.*
spec. undetermined.

PSELAPHIDÆ.

Rafonus tolulæ *Lec.*
Rhexius insculptus *Lec.*
schmitti *Brend.*
Rhexidius canaliculatus *Lec.*
trogasteroides *Brend.*
Trimium parvulum *Lec.*
thoracicum *Brend.*
sp.
Euplectus crinitus *Lec.*
interruptus *Lec.*
confluens *Lec.*
elongatus *Brend.*
pertenuis *Casey.*
leviceps *Casey.*
sp.
Trimioplectus obsoletus *Brend.*
arcuatus ? *Lec.*
ruficeps *Lec.*
Actium sp.
Eutyphlus similis *Lec.*
Thesium cavifrons *Lec.*
Arianops amblyoponica *Brend.*
Batrisus schaumii *Aube.*
riparius *Say.*
Batrisus scabriceps *Lec.*
† bistriatus *Lec.*
frontalis *Lec.*
globosus *Lec.*
virginiæ *Casey.*
furcatus *Brend.*
foveicornis *Casey.*
punctifrons *Casey.*
denticollis *Casey.*
striatus *Lec.*
Bryaxis divergens *Lec.*
radians *Lec.*
rubicunda *Aube.*
perforata *Brend.*
n. sp.
semirugosa *Brend.*
Rybaxis conjuncta *Lec.*
† Decarthron abnorme *Lec.*
n. s. [*Brend.*
Bythinus (subgen. *Bythinus*) carinatus
(subgen. *Machærites*) tychoi-
Tychus minor *Lec.* ? var. [des *Brend.*
testaceus *Casey.*
† Ctenistes piceus *Lec.*

Ctenistes consobrinus *Lec.*
† Ceophyllus monilis *Lec.*
† Tmesiphorus costalis *Lec.*
carinatus *Say.*
† Cedius ziegleri *Lec.*
spinosus *Lec.*
† Tyrus humeralis *Aube.*
Adranes cœcus *Lec.*

STAPHYLINIDÆ.

The Aleocharini are mostly uncollected.

Falagria cingulata *Lec.*
dissecta *Er.*
n. s.
Hoplandria lateralis *Mels.*
n. s.
Homalota trimaculata *Er.*
pedicularis *Mels.*
ambigua *Er.*
Amischa analis *Grav.*
Colpodota lividipennis *Mann.*
Lomechusa cava *Lec.*
Tachyusa cavicollis *Lec.*
gracillima *Lec.*
* Myrmedonia schmitti n. s.
* rudis *Lec.*
Aleochara lata *Grav.*
brachypterus *Fourc.*
bimaculata *Grav.*
nitida *Grav.*
two sp. undetermined.
Oxypoda sagulata *Er.*
Bolitochara picta *Fauv.*
blanchardi Casey.
Gyrophæna vinula *Er.*
flavicornis *Mels.*
socia *Er.*
Dinopsis americana *Kraatz.*
Acylophorus flavicollis *Sachse.*
pronus *Er.*
Heterothops fumigatus *Lec.*
Quedius fulgidus *Fab.*
peregrinus *Grav.*
capucinus *Grav.*
lævigatus *Gyll.*
molochinus *Grav.*
Listotrophus cingulatus *Grav.*
* capitatus *Bland.*
Creophilus maxillosus *Linn.* var.
Staphylinus badipes *Lec.*
vulpinus *Nord.*
maculosus *Grav.*
mysticus *Er.*
Staphylinus comes *Lec.*
cinnamopterus *Grav.*
violaceus *Grav.*
Ocypus ater *Grav.*
Belonuchus formosus *Grav.*
Philonthus politus *Linn.*
æneus ‡ plur. auct.
furvus *Nord.*
lætulus *Say.*
asper *Horn.*
hepaticus *Er.*
palliatus *Grav.*
debilis *Grav.*
varians *Payk.*
thoracicus *Germ.*
fusiformis *Mels.*
micans *Grav.*
lomatus *Er.*
brunneus *Grav.*
cyanipennis *Fab.*
blandus *Grav.*
quediinus *Horn.*
sordidus *Grav.*
nigritulus *Grav.*
micropthalmus *Horn.*
apicalis *Say.*
viridanus *Horn.*
confertus *Lec.*
Actobius cinerascens *Grav.*
fraterculus *Horn.*
sobrinus *Er.*
parcus *Horn.*
paderoides *Lec.*
jocosus *Horn.*
Xantholinus cephalus *Say.*
fulgidus *Fab.*
obsidianus *Mels.*
emmesus *Grav.*
obscurus *Er.*
var. (small).
Leptacinus longicollis *Lec.*
Baptolinus longiceps *Fauv.*

Stenus bipunctatus *Er.* not *Casey.*
flavicornis *Er.*
annularis *Er.*
callosus *Er.*
punctatus *Er.*
several spec. undetermined.
Euæsthetus americanus *Er.*
Edaphus nitidus *Lec.*
Stictocranius puncticeps *Lec.*
Cryptobium badium *Grav.*
bicolor *Grav.*
var. melanocephalum *Er.*
pallipes *Grav.*
latebricola *Nord.*
cribratum *Lec.*
Lathrobium grande *Lec.*
terminatum *Grav.*
punctulatum Lec.
angulare *Lec.*
bicolor *Lec.*
armatum *Say.*
longiusculum *Grav.*
collare *Er.*
anale *Lec.*
Stilicus opaculus *Lec.*
angularis *Lec.*
dentatus *Say.*
biarmatus *Lec.*
Trachysectus confluens *Say.*
Anderocharis corticina *Grav.*
Pæderus littorarius *Grav.*
Sunius prolixus *Er.*
binotatus *Say.*
longiusculus *Mann.*
Pinophilus latipes *Grav.*
Tachinus memnonius *Grav.*
repandus *Horn.*
flavipennis *Dej.*
luridus *Er.*
fimbriatus *Grav.*
limbatus *Mels.*
fumipennis *Say.*
pallipes *Grav.*
nitiduloides *Horn.*
Tachyporus elegans *Horn.*
jocosus *Say.*
chrysomelinus *Linn.*
nanus *Er.*
nitidulus *Fab.*
Cilea silphoides *Linn.*
Erchomus ventriculus *Say.*
Conurus littorens *Linn.*
crassus *Grav.*
pubescens *Payk.*
knoxii *Lec.*
opicus *Say.*
scriptus *Lec.*
Boletobius niger *Grav.*
dimidiatus *Er.*
intrusus *Horn.*
cincticollis *Say.*
anticus *Horn.*
angularis *Sachse.*
exoletus *Er.*
cinctus *Grav.*
var. gentilis *Lec.*
Bryoporus rufescens *Lec.*
Mycetoporus humidus *Say.*
Olisthærus substriatus *Gyll.*
Megalops cælatus *Grav.*
Oxyporus femoralis *Grav.*
major *Grav.*
stygicus *Say.*
vittatus *Grav.*
lateralis *Grav.*
occipitalis *Fauv.*
lepidus *Lec.*
quinquemaculatus *Lec.*
* var. with black head.
Osorius latipes *Grav.*
Bledius semiferrugineus *Lec.*
annularis *Lec.*
stabilis *Casey.*
emarginatus *Say.*
Platystethus americanus *Er.*
Oxytelus rugosus *Grav.*
pennsylvanicus *Er.*
suspectus *Casey.*
nitidulus Lec.
insignitus *Grav.*
* placusinus *Lec.*
exiguus *Er.*
Trogophlœus quadripunctatus *Say.*
spretus *Casey.*
congener *Casey.*
incertus *Casey.*
decoloratus *Casey.*
uniformis *Lec.*
memnonius *Er.*
Apocellus sphæricollis *Say.*

Apocellus bicolor *Fauv.* ? *Casey.*
Thinobius sp. .02 inch. long.
Geodromicus verticalis *Say.*
strictus *Fauv.*
Lesteva pallipes *Lec.*
Arpedium angulare *Fauv.*
cribratum *Fauv.*
Trigonodemus striatus *Lec.*
Lathrimæum sordidum *Er.*
Olophrum obtectum *Er.*
* Homalium foraminosum *Mack.*
* flavidum n. s.
humerosum *Fauv.*
Homalium punctiventre *Fauv.*
rufipes *Fauv.*
Anthobium convexum *Fauv.*
hornii *Fauv.*
Protinus atomarius *Er.*
* Lispinus tenellus *Er.*
Glyptoma costale *Er.*
Triga picipennis *Lec.*
Eleusis pallida *Lec.*
nigrella *Lec.*
Siagonium americanum *Mels.*
punctatum *Lec.*

TRICHOPTERYGIDÆ.

Many species were not collected.

Nanosella fungi *Lec.*
* Limulodes paradoxus *Math.*
Trichopteryx haldemanni *Lec.*

SCAPHIDIIDÆ.

Not collected extensively.

Scaphidium 4-guttatum *Say.*
var. piceum *Mels.*
Bæocera apicalis *Lec.*
Scaphisoma convexum *Say.*
Scaphisoma suturale *Lec.*
terminatum *Mels.*
pusillum *Lec.*

PHALACRIDÆ.

Phalacrus politus *Mels.*
sp. not determined.
Olibrus pallipes *Say.*
striatulus Lec.
Olibrus semistriatus *Lec.*
Stilbus apicalis *Mels.*
nitidus *Mels.*
several unnamed Phalacridæ.

CORYLOPHIDÆ.

Sancium fasciatum *Say.*
luuatum *Lec.*
Arthrolips marginicollis *Lec.*
Corylophodes truncatus *Lec.*
Sericoderus flavidus *Lec.*
obscurus *Lec.*
Orthoperus glaber *Lec.*

COCCINELLIDÆ.

Megilla maculata *DeG.*
Hippodamia glacialis *Fab.*
15-maculata *Muls.*
convergens *Guer.*
13-punctata *Linn.*
parenthesis *Say.*
Coccinella affinis *Randl.*
9-notata *Herbst.*
sanguinea *Linn.*
Adalia bipunctata *Linn.*
Mysia pullata *Say.*
Anatis ocellata *Linn.*
15-punctata *Oliv.*
Psyllobora 20-maculata *Say.*
Chilocorus bivulnerus *Muls.*
Exochomus marginipennis *Lec.*
Cryptognatha pusilla *Lec.*
Brachyacantha ursina *Fab.*

Brachyacantha 4-punctata *Mels.*
Hyperaspis fimbriolata *Mels.*
undulata *Say.*
discreta *Lec.*
signata *Oliv.*
proba *Say.*
bigeminata *Rand.*
Scymnus terminatus *Say.*
flavifrons *Mels.*
Scymnus americanus *Muls.*
fraternus *Lec.*
hæmorrhous Lec.
brullei *Muls.*
collaris *Lec.*
tenebrosus *Muls.*
punctum *Lec.*
Epilachna borealis *Fab.*

ENDOMYCHIDÆ.

Symbiotes ulkei *Crotch.*
minor *Crotch.*
Mycetæa hirta *Marsh.*
Rhanis unicolor *Zieg.*
Phymaphora pulchella *Newm.*
Lycoperdina ferruginea *Lec.*
Aphorista vittata *Fab.*
Mycetina perpulchra *Newm.*
* testacea *Zieg.*
Endomychus biguttatus *Say.*

EROTYLIDÆ.

Languria bicolor *Fab.*
mozardi *Latr.*
trifasciata *Say.*
lecontei *Crotch.*
Acropteroxys gracilis *Newm.*
Pœosoma punctatum *Lec.*
Dacne 4-maculata *Say.*
Megalodacne fasciata *Fab.*
heros *Say.*
Ischyrus 4-punctatus *Oliv.*
Mycotretus sanguinipennis *Say.*
pulchra *Say.*
Tritoma humeralis *Fab.*
var. *d*, entirely black above.
biguttata *Say.*
mimetica *Crotch.*
angulata *Say.*
unicolor *Say.*
thoracica *Say.*
flavicollis *Lacor.*

COLYDIIDÆ.

Synchita fuliginosa *Mels.*
parvula *Guer.*
Cicones marginalis *Mels.*
Ditoma 4-guttata *Say.*
Coxelus guttulatus *Lec.*
Aulonium parallelopipedum *Say.*
Colydium lineola *Say.*
Penthelispa hæmatodes *Fab.*
* reflexa *Say.*
Pycnomerus sulcicollis *Lec.*
Bothrideres geminatus *Say.*
Cerylon castaneum *Say.*
Philothermus glabriculus *Lec.*
Mychocerus depressus *Lec.*

RHYSODIDÆ.

Rhysodes exaratus *Serv.*
Clinidium sculptile *Newm.*

CUCUJIDÆ.

Silvanus surinamensis *Linn.*
bidentatus *Fab.*
planatus *Germ.*
imbellis *Lec.*
advena *Watl.*
Nausibius clavicornis *Kug.*
dentatus Marsh.
Catogenus rufus *Fab.*
Pediacus depressus *Herbst.*
Cucujus clavipes *Fab.*
Læmophlœus biguttatus *Say.*
fasciatus *Mels.*
convexulus *Lec.*
adustus *Lec.*
testaceus *Fab.*
rotundicollis *Casey.*
Dendrophagus cygnæi *Mann.*
Brontes dubius *Fab.*
debilis *Lec.*
Telephanus velox *Herald.*

CRYPTOPHAGIDÆ.

Telmatophilus americanus *Lec.*
Loberus impressus *Lec.*
Tomarus pulchellus *Lec.*
Antherophagus ochraceus *Mels.*
Henotveus serratus *Gyll.*
Cryptophagus crocens *Zimm.*
Cryptophagus fungicola *Zimm.*
two species not determined.
Cœnoscelis ferruginea *Sahlb.*
Atomaria ochracea *Zimm.*
ephippiata *Zimm.*
humeralis n. s.

MYCETOPHAGIDÆ.

Mycetophagus punctatus *Say.*
flexuosus *Say.*
pluripunctatus *Lec.*
obsoletus *Mels.*
Triphyllus humeralis *Kirby.*
Litargus sexpunctatus *Say.*
Litargus tetraspilotus *Lec.*
didesmus *Say.*
nebulosus *Lec.*
Typhæa fumata *Linn.*
Diplocœlus brunneus *Lec.*

DERMESTIDÆ.

Bytturus unicolor *Say.*
Dermestes caninus *Germ.*
var. rattus *Lec.*
pulcher *Lec.*
lardarius *Linn.*
vulpinus *Fab.*
Attagenus piceus *Oliv.*
pellio *Linn.*
Dearthrus longulus *Lec.*
Trogoderma ornatum *Say.*
Anthrenus verbasci *Linn.*
varius Fab.
museorum *Linn.*
castaneæ Mels.
Cryptorhopalum triste *Lec.*
Orphilus niger *Rossi.*
glabratus Fab.

HISTERIDÆ.

Hololepta lucida *Lec.*
fossularis *Say.*
Hister planipes *Lec.*
harrisii *Kirby.*
merdarius *Hoffm.*
interruptus *Beauv.*
marginicollis *Lec.*
cognatus *Lec.*
fœdatus *Lec.*
abbreviatus *Fab.*
civilis *Lec.*
depurator *Say.*
furtivus *Lec.*
servus *Er.*
bimaculatus *Linn.*
sedecimstriatus *Say.*
americanus *Payk.*
subrotundus *Say.*
vernus *Say.*
carolinus *Payk.*
lecontei *Mars.*
aurelianus *Horn.*
parallelus *Say.*
coarctatus *Lec.*
Hister * basalis *Lec.*
Epierus pulicarius *Er.*
Tribalus americanus *Lec.*
Hetærius brunnipennis *Rand.*
Onthophilus alternatus *Say.*
var. nodatus *Lec.*
Dendrophilus punctulatus *Say.*
Paromalus æqualis *Say.*
ostriatus *Lec.*
conjunctus *Say.*
bistriatus *Er.*
seminulum *Er.*
Carcinops 14-striatus *Steph.*
Saprinus rotundatus *Kug.*
assimilis *Payk.*
fraternus *Say.*
litchii *Mars.*
Plegaderus transversus *Say.*
Teretrius americanus *Lec.*
Bacanius tantillus *Lec.*
Acritus exiguus *Er.*
Aeletes politus *Lec.*
simplex *Say.*

NITIDULIDÆ.

Brachypterus urticæ *Fab.*
Cercus abdominalis *Er.*
pennatus *Murr.*
Carpophilus hemipterus *Linn.*
mutilatus *Er.*
dimidiatus Fab.
niger *Say.*
marginatus *Er.*
corticinus *Er.*
brachypterus *Say.*
Colastus morio *Er.*
semitectus *Say.*
unicolor *Say.*
truncatus *Rand.*
Conotelus obscurus *Er.*
Epuræa helvola *Er.*
rufa *Say.*
erichsonii *Reit.*
rufida *Mels.*
avara *Rand.*
truncatella *Mann.*
labilis *Er.*
Nitidula bipunctata *Linn.*
rufipes *Linn.*
ziczac *Say.*
Stelidota geminata *Say.*
Stelidota octomaculata *Say.*
Prometopia 6-maculata *Say.*
Phenolia grossa *Fab.*
Omosita colon *Linn.*
Soronia undulata *Say.*
substriata *Ham.*
Perthalycra murrayi *Horn.*
Pocadius helvolus *Er.*
Meligethes mutatus *Harold.*
Oxycnemus histrina *Lec.*
Amphicrossus ciliatus *Oliv.*
Pallodes pallidus *Beauv.*
silaceus Er.
Cychramus adustus *Er.*
Cryptarcha ampla *Er.*
concinna *Mels.*
Ips obtusus *Say.*
quadriguttatus *Fab.* var.
fasciatus Oliv. and variations.
sanguinolentus *Oliv.*
confluentus *Say.*
Rhizophagus cylindricus *Lec.*
bipunctatus *Say.*
remotus *Lec.*
minutus *Mann.*

LATRIDIDÆ.

Stephostethus liratus *Lec.*
Enicmus minutus *Linn.*
Latridius opaculus *Lec.*
filiformis *Gyll.*
Corticaria elongata *Gyll.*
Corticaria cavicollis *Mann.*
Melanopthalma distinguenda *Commol.*
pumila Mels
picta *Lec.*
several species not collected.

TROGOSITIDÆ.

Nemosoma cylindricum *Lec.*
Alindria cylindrica *Serv.*
Tenebroides mauritanicus *Linn.*
corticalis *Mels.*
var. dubius *Mels.*
nanus *Mels.*
Tenebroides americanus *Kirby.*
castaneus Mels.
bimaculatus *Mels.*
Ostoma ferrugineum *Linn.*
Grynocharis 4-lineata *Mels.*
Thymalus fulgidus *Er.*

MONOTOMIDÆ.

Monotoma americana *Aube.*
longicollis *Gyll.*
Europs pallipennis *Lec.*
Bactridium ephippigerum *Guer.*
striolatum *Reit.*
cavicolle *Horn.*

DERODONTIDÆ.

Derodontus maculatus *Mels.*

BYRRHIDÆ.

Nosodendron unicolor *Say.*
* Byrrhus geminatus *Say.*
* Byrrhus murinus *Fab.*
* Limnichus punctatus *Lec.*

PARNIDÆ.

Not collected exhaustively.

* Psephenus lecontei *Lec.*
Dryops lithophilus *Germ.*
fastigiatus *Say.*
Elmis divergens *Lec.*
quadrinotatus *Say.*
Stenelmis crenatus *Say.*
vittipennis *Zimm.*
Macronychus glabratus *Say.*
Ancyronyx variegatus *Germ.*

HETEROCERIDÆ.

Heterocerus ventralis *Mels.*
undatus *Mels.*
var. mollinus *Kies.*
brunneus *Mels.*
Heterocerus schwarzi *Horn.*
collaris *Kies.*
pusillus *Say.*

DASCYLLIDÆ.

Eurypogon niger *Mels.*
Anchytarsus bicolor *Mels.*
Ptilodactyla serricollis *Say.*
Eucinetus testaceus *Lec.*
morio *Lec.*
Ectropia nervosa *Mels.*
Prionocyphon discoideus *Say.*
limbatus *Lec.*
Helodes pulchella *Guer.*
thoracica *Guer.*
Scirtes orbiculatus *Fab.*
Cyphon ruficollis *Say.*
obscurus *Guer.*
collaris *Guer.*
variabilis *Thumb.*
n. s.

RHIPICERIDÆ.

Zenoa picea *Beauv.*
Sandalus petrophya *Knoch.*

ELATERIDÆ.

Tharops ruficornis *Say.*
Deltometopus amœnicornis *Say.*
rufipes *Mels.*
Dromæolus harringtoni *Horn.*
cylindricollis *Say.*
striatus *Lec.*
Fornax badius *Mels.*
horni *Bonv.*
calceatus *Say.*
orchesides *Newm.*
bicolor *Mels.*
Microrhagus pectinatus *Lec.*
triangularis *Say.*
Entomopthalmus rufiolus *Lec.*
Nematodes atropos *Say.*
penetrans *Lec.*
‡ Eucnemide sp. or n. s.
Phlegon heterocerus *Say.*
Cerophytum pulsator *Hald.*
Perothops mucida *Gyll.*
Adelocera impressicollis *Say.*
marmorata *Fab.*
discoidea *Web.*
avita *Say.*
obtecta *Say.*
Alaus oculatus *Linn.*
Cardiophorus cardisce *Say.*
convexus *Say.*
gagates *Er.*
convexulus *Lec.*
Horistonotus curiatus *Say.*
Cryptohypnus abbreviatus *Say.*
Hypnoidus striatulus *Lec.*
obliquatulus *Say.*

Oedostethus femoralis *Lec.*
Monocrepidius lividus *DeG.*
vespertinus *Fab.*
auritus *Herbst.*
bellus *Say.*
Dicrepidius palmatus *Cand.*
Elater hepaticus *Mels.*
manipularis *Cand.*
mixtus *Herbst.*
linteus *Say.*
discoideus *Fab.*
vitiosus *Lec.*
sayi *Lec.*
impolitus *Mels.*
socer *Lec.*
rubricollis *Herbst.*
semicinctus *Rand.*
militaris *Harris.*
luctuosus *Lec.*
nigricans *Germ.*
rubricus *Say.*
collaris *Say.*
xanthomus *Germ.* [*Germ.*
apicatus var. phœnicopterus
obliquus *Say.*
var. areolatus *Say.*
pusio *Germ.*
n. s.
Drasterius elegans *Fab.*
Megapenthes limbalis *Herbst.*
Ludius attenuatus *Say.*
abruptus *Say.*
Agriotes mancus *Say.*
insanus *Cand.*
pubescens *Mels.*
oblongicollis *Mels.*
Dolopius lateralis *Esch.*
Betarmon bigeminatus *Rand.*
Glyphonyx recticollis *Say.*
testaceus *Mels.*
Melanotus corticinus *Say.*
decumanus *Er.*
angustatus *Er.*
trapezoideus *Lec.*
castanipes *Lec.*
fissilis *Say.*
communis *Gyll.*
exuberans *Lec.*
Melanotus parumpunctatus *Mels.*
verberans *Lec.*
pertinax *Say.*
americanus *Herbst.*
gradatus *Lec.*
sagittarius *Lec.*
Limonius auriplus *Say.*
aurifer *Lec.*
griseus *Beauv.*
interstitialis *Mels.*
plebeius *Say.*
confusus *Lec.*
quercinus *Say.*
basillaris *Say.*
agonus *Say.*
ornatipennis *Lec.*
definitus *Zieg.*
nimbatus *Say.*
Campylus denticornis *Kirby.*
* productus *Rand.*
Athous brightwelli *Kirby.*
acanthus *Say.*
var. maculicollis *Lec.*
cucullatus *Say.*
scapularis *Say.*
equestris *Lec.*
* Leptoschema discalceatum *Say.*
Oestodes tenuicollis *Rand.*
Sericosomus viridanus *Say.*
silaceus *Say.*
Corymbites cylindriformis *Herbst.*
rufipes *Bland.*
pyrrhos *Herbst.*
tarsalis *Mels.*
elongaticollis *Ham.*
sulcicollis *Say.*
æthiops *Herbst.*
hamatus *Say.*
hieroglyphicus *Say.*
inflatus *Say.*
rotundicollis *Say.*
Asaphes indistinctus *Lec.*
decoloratus *Say.*
var. æreus *Mels.*
memnonius *Herbst.*
bilobatus *Say.*
Melanactes piceus *DeG.*
Cebrio bicolor *Fab.*

THROSCIDÆ.

Drapetes geminatus *Say.*
Aulonothroscus constrictor *Say.*
Throscus chevrolati *Bonv.*

BUPRESTIDÆ.

Chalcophora virginiensis *Drury.*
fortis *Lec.*
campestris *Say.*
Dicerca divaricata *Say.*
pugionata *Germ.*
lurida *Fab.*
lepida *Lec.*
spreta *Gory.*
tuberculata *Cher.*
Pœcilonota cyanipennis *Say.*
Buprestis rufipes *Oliv.*
fasciata *Fab.*
striata *Fab.*
ultramarina *Say.*
Cinyra gracilipes *Mels.*
Melanophila acuminata *DeG.*
appendiculata Fab.
longipes Say.
fulvoguttata *Gory.*
Anthaxia viridipennis *Harris.*
viridicornis *Say.*
quercata *Fab.*
* flavimana *Gory.*
Chrysobothris femorata *Fab.*
floricola *Gory.*
3-nervia *Kirby.*
Chrysobothris 6-signata *Say.*
Acmæodera pulchella *Herbst.*
culta *Web.*
Ptosima gibbicollis *Say.*
Mastogenius subcyaneus *Lec.*
Eupristocerus cogitans *Web.*
Agrilus otiosus *Say.*
arcuatus *Say.*
var. *coryli* Horn.
vittatocollis *Rand.*
bilineatus *Web.*
granulatus *Say.*
acutipennis *Mann.*
politus *Say.*
fallax *Say.*
obsoletoguttatus *Gory.*
subcinctus *Gory.*
lecontei *Saunders.*
egenus *Gory.*
Taphrocerus gracilis *Say.*
Brachys ovata *Web.*
tessellata *Fab.*
ærosa *Mels.*
æruginosa *Gory.*
Pachyscelus lævigatus *Say.*

LAMPYRIDÆ.

Not collected closely.

Rhyncheros sanguinipennis *Say.*
Calopteron terminale *Say.*
reticulatum *Fab.*
Celetes basalis *Lec.*
Cænia dimidiata *Fab.*
Lopheros fraternus *Rand.*
Eros thoracicus *Rand.*
aurora *Herbst.*
sculptilis *Say.*
trilineatus *Mels.*
Plateros modestus *Say.*
canaliculatus *Say.*
Calochromus perfacetus *Say.*
Lucidota atra *Fab.*
var. *tarda* Lec.
punctata *Lec.*
Ellychina corusca *Linn.*
var. autumnalis *Mels.*
Pyropyga nigricans *Say.*
decipiens *Harr.*
fenestralis *Mels.*
Pyractomena lucifera *Mels.*
borealis *Rand.*
Photinus marginellus *Lec.*
var. *castus* Lec.
scintillans *Say.*
pyralis *Say.*
Photuris pennsylvanica *DeG.*
‡ Phengodes plumosus *Oliv.*
Chauliognathus pennsylvanicus *DeG.*
marginatus *Fab.*
Podabrus tricostatus *Say.*

Podabrus rugulosus *Lec.*
basilaris *Say.*
diadema *Fab.*
modestus *Say.*
tomentosus *Say.*
protensus *Lec.*
brunnicollis *Lec.*
cinctipennis *Lec.*
limbellus *Lec.*
punctatus *Lec.*
pattoni *Lec.*
Silis percomis *Say.*
Telephorus dentiger *Lec.*
excavatus *Lec.*
fraxini *Say.*
carolinus *Fab.*
Telephorus lineola *Fab.*
rectus *Mels.*
scitulus *Say.*
longulus *Lec.*
tuberculatus *Lec.*
bilineatus *Say.*
Polemius laticornis *Say.*
Ditemnus bidentatus *Say.*
Trypherus latipennis *Germ.*
Malthinus atripennis *Lec.*
occipitalis *Lec.*
Malthodes exilis *Mels.*
fragilis *Lec.*
arcifer *Lec.*
fuliginosus *Lec.*
two spec. undetermined.

MALACHIDÆ.

Collops quadrimaculatus *Fab.*
Anthocomus erichsoni *Lec.*
flavilabris *Say.*
Pseudebæus apicalis *Say.*
bicolor *Lec.*
Pseudebæus oblitus *Lec.*
Attalus terminalis *Er.*
otiosus *Say.*
scincetus *Say.*

CLERIDÆ.

Elasmocerus terminatus *Say.*
Cymatodera bicolor *Say.*
inornata *Say.*
undulata *Say.*
Priocera castanea *Newm.*
Trichodes apivorus *Germ.*
Clerus quadrisignatus *Say.*
4-guttatus *Oliv.* var. uigripes *Say*
‡ lunatus *Spin.*
thoracicus *Oliv.*
* Thanasimus dubius *Fab.*
* trifasciatus *Say.*
Thanoclerus sanguineus *Say.*
Hydnocera unifasciata *Say.*
Hydnocera humeralis *Say* and var.
pallipennis *Say.*
verticalis *Say.*
longicollis *Zieg.*
Phyllobænus dislocatus *Say.*
Ichnea laticornis *Say.*
Chariessa pilosa *Forst.*
var. *onusta* Say.
Cregya vetusta *Spin.*
oculata *Say.*
Orthopleura damicornis *Fab.*
Necrobia rufipes *Fab.*
ruficollis *Fab.*
violacea *Linn.*

PTINIDÆ.

Ptinus brunneus *Duft.*
fur *Linn.*
quadrimaculatus *Mels.*
Eucrada humeralis *Mels.*
Oligomerus sericans *Mels.*
alternans *Lec.*
Sitodrepa panicea *Linn.*
Hadrobregmus errans *Mels.*
carinatus *Say.*
Hadrobregmus pumilus *Lec.*
n. s.
Trichodesma gibbosa *Say.*
Anobium notatum *Say.*
Trypopitys sericeus *Say.*
Petalium bistriatum *Say.*
Theca profunda *Lec.*
Eupactus nitidus *Lec.*
Xyletinus peltatus *Harr.*

Xyletinus lugubris *Lec.*
Hemiptychus gravis *Lec.*
nigritulus *Lec.*
castaneus *Ham.*
Protheca puberula *Lec.*
hispida *Lec.*
Dorcatoma setulosum *Lec.*
pallicorne *Lec.*
two new species.
Cænocara oculata *Say.*
Ptilinus ruficornis *Say.*

Endecatomus rugosus *Raud.*
Sinoxylon basilare *Say.*
bidentatum *Horn.*
Bostrychus bicornis *Web.*
truncaticollis *Lec.*
Dinoderus densus *Lec.*
punctatus *Say.*
Lyctus striatulus *Mels.*
opaculus *Lec.*
planicollis *Lec.*
Trogoxylon parallelopipedum *Mels.*

CUPESTIDÆ.

Cupes concolor *West.*

Cupes * capitata *Fab.*

LIMEXILIDÆ.

Lymexylon sericeum *Harr.*

CIOIDÆ.

Cis creberrimus *Mellie.*
fuscipes *Mellie.*
three sp. undetermined.
Ennearthron thoracicornis *Zieg.*

Ceracis sallei *Mellie.*
Sphindus americanus *Lec.*
Eurysphindus hirtus *Lec.*

LUCANIDÆ.

Lucanus dama *Thunb.*
Doreus parallelus *Say.*
Platycerus quercus *Web.*
depressus *Lec.*

Cernchus piceus *Web.*
Nicagus obscurus *Lec.*
Passalus cornutus *Fab.*

SCARABÆIDÆ.

Canthon lævis *Drury.*
viridis *Beauv.*
Chœridium histeroides *Web.*
Copris minutus *Drury.*
anaglypticus *Say.*
carolina *Linn.*
Phanæus carnifex *Linn.*
Onthophagus hecate *Panz.*
janus var. orpheus *Panz.*
var. striatulus *Beauv.*
pennsylvanicus *Harold.*
Aphodius fossor *Linn.*
fimetarius *Linn.*
putridus *Mels.*
ruricola *Mels.*
granarius *Linn.*
vittatus *Say.*
stercorosus *Mels.*

Aphodius bicolor *Say.*
inquinatus *Herbst.*
terminalis *Say.*
*‡ rufipes *Linn.*
rubripennis *Horn.*
femoralis *Say.*
oblongus *Say.*
Dialytes truncatus *Mels.*
striatulus *Say.*
*ulkei *Horn.*
Atænius abditus *Hald.*
gracilis *Mels.*
cognatus *Lec.*
* Psammodius n. s.
Bolboceras, var. tumefactus *Beauv.*
lazarus *Fab.*
Odontæus cornigerus *Mels.*
Geotrupes splendidus *Fab.*

Geotrupes semiopacus *Jekel*
egeriei *Germ.*
balyi *Jekel.*
hornii *Blanch.*
Cœotus aphodioides *Ill.*
globosus *Say.*
Trox tuberculatus *DeG.*
crinaceus *Lec.*
capillaris *Say.*
unistriatus *Beauv.*
insularis *Chev.*
terrestris *Say.*
æqualis *Say.*
scaber *Linn.*
striatus *Mels.*
Hoplia trifasciata *Say.*
trivialis *Harold.*
mucorea *Germ.*
modesta *Hald.*
Dichelonycha elongata *Lec.*
subvittata *Lec.*
fuscula *Lec.*
albicollis *Burm.*
Serica vespertina *Gyll.*
iricolor *Say.*
sericea *Ill.*
trociformis *Burm.*
Macrodactylus subspinosus *Fab.*
‡ Diplotaxis liberta *Germ.*
frondicola *Say.*
Lachnosterna gibbosa *Burm.*
inversa *Horn.*
micans *Knoch.*
vehemens *Horn.*
arcuata *Smith.*
cephalica *Lec.*
insperata Smith.
dubia *Smith.*
fusca *Knoch.*
Lachnosterna * barda *Horn.*
marginalis *Lec.*
fraterna *Harris.*
rugosa *Mels.*
innominata *Smith.*
balia *Say.*
villifrons *Lec.*
nitida *Lec.*
hirticula *Knoch.*
illicis *Knoch.*
crenulata *Froel.*
tristis *Fab.*
Anomala undulata *Mels.*
lucicola *Fab.*
marginata *Fab.*
Strigoderma arboricola *Fab.*
Pelidnotata punctata *Linn.*
Cotalpa lanigera *Linn.*
Polymœchus brevipes *Lec.*
Chalepus trachypygus *Burm.*
Ligyrus relictus *Say.*
Aphonus tridentatus *Say.*
Xyloryctes satyrus *Fab.*
‡ Dynastes tityus *Linn.*
Allorhina nitida *Linn.*
Euphoria sepulchralis *Fab.*
fulgida *Fab.*
inda *Linn.*
Cremastochilus variolosus *Kirby.*
canaliculatus *Kirby.*
harrisii *Kirby.*
Osmoderma eremicola *Knoch.*
scabra *Beauv.*
Gnorimus maculosus *Knoch.*
Trichius piger *Fab.*
affinis *Gory.*
bibens *Fab.*
Valgus canuliculatus *Fab.*
squamiger *Beauv.*

SPONDYLIDÆ.

Parandra brunnea *Fab.*

CERAMBYCIDÆ.

Orthosoma brunneum *Forst.*
Prionus laticollis *Drury.*
imbricornis *Linn.*
‡ Tragosoma depsarium *Linn.*
harrisii Lec.
Sphenostethus taslei *Buq.*
Asemum mœstum *Hald.*
Criocephalus agrestis *Kirby.*
Tetropium cinnamopterum *Kirby.*
Smodicum cucujforme *Say.*
Physocnemum brevilineum *Say.*
Rhopalopus sanguinicollis *Horn.*

Phymatodes variabilis *Fab.*
amœnus *Say.*
dimidiatus *Kirby.*
varius *Fab.*
Merium proteus *Kirby.*
† Callidium antennatum *Newm.*
æreum *Newm.*
Dryobius sexfasciatus *Say.*
Gracilia minuta *Fab.*
Stromatium pubescens *Hald.*
Chion cinctus *Drury.*
var. *garganicus* Fab.
Eburia quadrigeminata *Say.*
Romaleum atomarium *Drury.*
rufulum *Hald.*
Elaphidion mucronatum *Fab.*
incertum *Newm.*
villosum *Fab.*
parallelum Lec.
cinerascens *Lec.*
Tylonotus bimaculatus *Hald.*
Heterachthes 4-maculatus *Newm.*
Obrium rubrum *Newm.*
rubidum *Lec.*
Molochrus bimaculatus *Say.*
Callimoxys sanguinicollis *Oliv.*
Rhopalophora longipes *Say.*
Purpuricenus humeralis *Fab.*
axillaris *Hald.*
Batyle suturalis *Say.*
Stenosphenus notatus *Oliv.*
Cyllene pictus *Drury.*
robiniæ *Forst.*
Plagionotus speciosus *Say.*
* Calloides nobilis *Say.*
Arhopalus fulminans *Fab.*
Xylotrechus colonus *Fab.*
sagittarius *Germ.*
quadrimaculatus *Hald.*
undulatus *Say.*
* nitidus *Horn.*
Neoclytus scutellaris *Oliv.*
luscus *Fab.*
capræa *Say.*
erythrocephalus *Fab.*
Clytanthus ruricola *Oliv.*
albofasciatus *Lap.*
Microclytus gazellula *Hald.*
Cyrtophorus verrucosus *Oliv.*
Euderces picipes *Fab.*
Distenia undata *Oliv.*
Desmocerus palliatus *Forst.*
Necydalis mellita *Say.*
Encyclops cæruleus *Say.*
Rhagium inquisitor var.
lineatum Oliv.
* Centrodera decolorata *Harr.*
picta *Hald.*
sublineata *Lec.*
Toxotus schaumii *Lec.*
trivittatus *Say.*
vittiger Rand.
cylindricollis *Say.*
cinnamopterus *Rand.*
Pachyta monticola *Rand.*
* Anthophilax malachiticus *Hald.*
*attenuatus *Hald.*
Acmæops bivittata *Say.*
directa *Newm.*
Gaurotes cyanipennis *Say.*
abdominalis *Bland.*
‡ Bellamira scalaris *Say.*
Strangalia famelica *Newm.*
acuminata *Oliv.*
lutcicornis *Fab.*
bicolor *Swed.*
Typocerus zebratus *Fab.*
velutinus *Oliv.*
lugubris *Say.*
Leptura emarginata *Fab.*
subhamata *Rand.*
var. *elegans* Lec.
lineola *Say.*
rubida *Lec.*
chalybæa *Hald.*
capitata *Newm.*
nana *Newm.*
var. *hæmatites* Newm.
exigua *Newm.*
nitens *Forst.*
cordifera *Oliv.*
* nigrella *Say.*
canadensis *Kirby.*
rubrica *Say.*
vagans *Oliv.*
circumdata *Oliv.*
proxima *Say.*
biforis *Newm.*
octo-notata *Say.*
vittata *Oliv.*

Leptura pubera *Say.*
ruficollis *Say.*
var. *sphæricollis* Say.
vibex *Newm.*
aurata *Newm.*
mutabilis *Newm.* and var.
Cyrtinus pygmæus *Hald.*
Psenocerus supernotatus *Say.*
Monohammus titillator *Fab.*
scutellatus *Say.*
confusor *Kirby.*
Dorcaschema wildii *Uhler.*
alternatum *Say.*
nigrum *Say.*
Hætomis cinerea *Oliv.*
Goes tigrina *Dej.*
pulchra *Hald.*
debilis *Lec.*
tessellata *Hald.*
pulverulenta *Hald.*
oculata *Lec.*
Plectrodera scalator *Fab.*
Acanthoderes decipiens *Hald.*
quadrigibbus *Say.*
Leptostylus aculiferus *Say.*
parvus *Lec.*
perplexus *Hald.*
macula *Say.*
Liopus variegatus *Hald.*
alpha *Say.*
punctatus *Hald.*
Dectes spinosus *Say.*
Lepturges angulatus *Lec.*
signatus *Lec.*
querci *Fitch.*
facetus *Say.*
Hyperplatys aspersus *Say.*
maculatus *Hald.*
Urographis fasciata *Dej.*
Ecyrus dasycerus *Say.*
Eupogonius tomentosus *Hald.*
vestitus *Say.*
subarmatus *Lec.*
Oncideres cingulatus *Say.*
Saperda calcarata *Say.*
candida *Fab.*
cretata *Newm.*
fayi *Bland.*
vestita *Say.*
discoidea *Fab.*
tridentata *Oliv.*
lateralis *Fab.*
puncticollis *Say.*
concolor *Lec.*
Obera bimaculata *Oliv.*
var. 3-punctata || *Fab.*
var. basalis *Lec.*
tripunctata *Swed.*
amiabilis Hald.
ruficollis *Fab.*
‡ Tetraopes canteriator *Drap.*
tetraophthalmus *Forst.*

CHRYSOMELIDÆ.

Donacia palmata *Oliv.*
piscatrix *Lec.*
subtilis *Kunze.*
æqualis *Say.*
emarginata *Kirby.*
jucunda *Lec.*
Orsodacna atra *Ahr.*
Zeugophora varians *Cr.*
Syneta ferruginea *Germ.*
Lema trilineata *Oliv.*
Anomœa laticlavia *Forst.*
Coscinoptera dominicana *Fab.*
Babia quadriguttata *Oliv.*
Chlamys plicata *Fab.*
Exema dispar *Lec.*
Bassareus congestus *Fab.*
Bassareus formosus *Mels.*
var sulfuripennis *Mels.*
mammifer *Newm.*
var. sellatus *Suff.*
var. pretiosus *Mels.*
var. luteipennis *Mels.*
lituratus *Fab.*
Cryptocephalus notatus *Fab.*
4-*maculatus* Say.
quadruplex *Newm.*
guttulatus *Oliv.*
venustus *Fab.* and var.
var. simplex *Hald.*
gibbicollis *Hald.*
mutabilis *Mels.*
tinctus *Lec.*

Pachybrachys othonus *Say.*
pubescens *Oliv.*
riduatus Fab.
picturatus *Germ.*
trinotatus *Mels.*
tridens *Mels.*
carbonarius *Hald.*
luridus *Fab.*
atomarius *Mels.*
femoratus *Oliv.*
infaustus *Hald.*
hepaticus *Mels.*
dilatatus *Suff.*
three spec. undetermined.
Monachus ater *Hald.*
saponatus *Fab.*
Diachus auratus *Fab.*
pallidicornis *Suff.*
Triachus atomus *Suff.*
Fidia longipes *Mels.*
Xanthonia 10-notata *Say.*
villosula *Mels.*
Glyptoscelis pubescens *Fab.*
barbata *Say.*
Graphops pubescens *Mels.*
curtipennis *Mels.*
marcassita *Crotch.*
Typophorus viridicyaneus *Cr.*
canellus *Fab.*
var. aterrimus *Oliv.*
var. thoracicus *Mels.*
var. quadrinotatus *Say.*
var. sellatus *Horn.*
var. quadriguttatus *Lec.*
var. sexnotatus *Say.*
Chrysochus auratus *Fab.*
Tymnes tricolor *Fab.*
violaceus *Horn.*
metasternalis *Crotch.*
Colaspis brunnea *Fab.*
Rhabdopterus picipes *Oliv.*
Nodonota tristis *Oliv.*
convexa *Say.*
puncticollis *Say.*
Chrysodina globosa *Oliv.*
Doryphora clivicollis *Kirby.*
10-lineata *Say.*
Chrysomela suturalis *Fab.*
similis *Rogers.*
præcelsis *Rog.*
Chrysomela elegans *Oliv.*
scalaris *Lec.*
philadelphiaca *Linn.*
var. spirææ *Say.*
bigsbyana *Kirby.*
Plagiodera viridis *Mels.*
Gastroidea polygoni *Linn.*
cyanea *Mels.*
Melasoma lapponica *Linn.*
scripta *Fab.*
Phyllodecta vulgatissima *Linn.*
Trirhabda canadensis *Kirby.*
Galerucella tuberculata *Say.*
cavicollis *Lec.*
rufosanguinea *Say.*
notulata *Fab.*
notata *Fab.*
nymphææ *Linn.*
Diabrotica 12-punctata *Fab.*
vittata *Fab.*
Luperodes varicornis *Lec.*
thoracicus *Mels.*
meræa *Say.*
cyanellus *Lec.*
Phyllechthrus gentilis *Lec.*
Galeruca externa *Say.*
Cerotoma 3-furcata *Forst.*
cornuta Fab.
Blepharida rhois *Forst.*
Oedionychis gibbitarsus *Say.*
thoracica *Fab.*
vians *Ill.*
thyamoides *Crotch.*
limbalis *Mels.*
var. subvittata *Horn.*
6 maculata *Linn.*
quercata *Fab.* and var.
Homœpœta lustrans *Crotch.*
Disonycha pennsylvanica *Ill.*
var. pallipes *Crotch.*
carolina *Fab.*
glabrata *Fab.*
discoidea *Fab.*
triangularis *Say.*
xanthomelæna *Dalm.*
Haltica chalybea *Illig.*
ignita *Ill.* and var.
Orthaltica copalina *Fab.*
Crepidodera rufipes *Linn.*
helixines *Linn.*

Crepidodera atriventris *Mels.*
Epitrix cucumeris *Harr.*
Mantura floridana *Crotch.*
Chætocnema cribrata *Lec.*
subcylindrica *Lec.*
minuta *Mels.*
confinis *Crotch.*
Systena hudsonias *Forst.*
frontalis *Fab.*
tæniata *Say.*
var. blanda *Mels.*
marginalis *Ill.*
Glyptina spuria *Lec.*
Phyllotreta sinuata *Steph.*
vittata *Fab.*
bipustulata *Fab.*
picta *Say.*
Luperaltica senilis *Lec.*
fuscula *Say.*
Longitarsus testaceus *Mels.*
melanurus *Mels.*
Dibolia borealis *Chev.*
Psylliodes punctulata *Mels.*
Microrhopala porcata *Mels.*
Odontota dorsalis *Thunb.*
rubra *Web.*
nervosa *Panz.*
Stenispa metallica *Fab.*
Physonota unipunctata *Say.*
Cassida nigripes *Say.*
bivittata *Say.*
Coptocycla bicolor
aurichalcea Fab.
signifera *Herbst.*
guttata ‡ Oliv.
purpurata *Bohm.*
clavata *Fab.*
Chelymorpha argus *Licht.*

BRUCHIDÆ.

Bruchus pisorum *Linn.*
mimus *Say.*
discoideus *Say.*
alboscutellatus *Horn.*
calvus *Horn.*
obtectus *Say.*

TENEBRIONIDÆ.

Phellopsis obcordata *Kirby.*
Alobates pennsylvanicus *DeG.*
barbatus *Knoch.*
Iphthimus opacus *Lec.*
Merinus lævis *Oliv.*
‡ Upis ceramboides *Linn.*
Haplandrus femoratus *Fab.*
ater *Lec.*
Scotobates calcaratus *Fab.*
Xylopinus saperdioides *Oliv.*
ænescens *Lec.*
Tenebrio obscurus *Fab.*
molitor *Linn.*
castaneus *Knoch.*
tenebrioides *Beauv.*
Opatrinus notus *Say.*
Blapstinus metallicus *Fab.*
mœstus *Mels.*
Tribolium ferrugineum *Fab.*
madens *Charp.*
Diœdus punctatus *Lec.*
Echocerus maxillosus *Fab.*
Alphitobius diaperinus *Panz.*
Uloma impressa *Mels.*
imbellis *Lec.*
mentalis *Horn.*
Uloma punctulata *Lec.*
Eutochia picea *Mels.*
Anædus brunneus *Zieg.*
Paratenetus punctatus *Sol.*
fuscus *Lec.*
Diaperis maculata *Oliv.*
Arrhenoplita viridipennis *Fab.*
bicornis *Oliv.*
Platydema excavatum *Say.*
ruficorne *Sturm.*
flavipes *Fab.*
ellipticum *Fab.*
americanum *Lap.*
subcostatum *Lapl.*
Alphitophagus bifasciatus *Say.*
Hypophlœus parallelus *Mels.*
thoracicus *Mels.*
Pentaphyllus pallidus *Lec.*
Boletotherus bifurcus *Fab.*
Boletophagus corticola *Say.*
depressus *Rand.*
Helops micans *Fab.*
americanus *Beauv.*
æreus *Germ.*
Meracantha contracta *Beauv.*
Strongylium tenuicolle *Say.*

CISTELIDÆ.

Allecula punctulata *Mels.*
atra *Say.*
nigrans Mels.
Hymenorus pilosus *Mels.*
obscurus *Say.*
niger *Mels.*
communis *Lec.*
rufipes *Lec.*
humeralis *Lec.*
Cistela brevis *Say.*
* marginata *Zieg.*
sericea *Say.*
Isomira quadristriata *Coup.*
ruficollis *Ham.*
Mycetochares rufipes *Lec.*
laticollis *Lec.*
haldemani *Lec.*
foveatus *Lec.*
tenuis *Lec.*
lugubris *Lec.*
binotatus *Say.*
Chromatia amœna *Say* and var.
Capnochroa fuliginosa *Mels.*
Androchirus fuscipes *Mels.*

LAGRIIDÆ.

Arthromacra ænea *Say.*
var. (golden colored)
Statira gagatina *Mels.*

MELANDRYIDÆ.

Tetratoma truncorum *Lec.*
tessellata *Mels.*
Penthe obliquata *Fab.*
pimelia *Fab.*
Synchroa punctata *Newm.*
Eustrophus confinis *Lec.*
bicolor *Say.*
tomentosus *Say.*
Holostrophus bifasciatus *Say.*
Hallomenus scapularis *Mels.*
Orchesia castanea *Mels.*
Melandrya striata *Say.*
Emmesa labiata *Say.*
* Zilora hispida *Lec.*
Spilotus 4-pustulosus *Mels.*
* Carebara longula *Lec.*
Mystaxis simulator *Newm.*
* Enchodes sericea *Hald.*
Serropalpus barbatus *Schall.*
Hypulus lituratus *Lec.*
vaudoueri *Muls.*
Symphora flavicollis *Hald.*
rugosa *Hald.*
Scraptia sericea *Mels.*
Canifa plagiata *Mels.*
pusilla *Hald.*
pallipes *Mels.*
Nothus varians *Lec.*

PYTHIDÆ.

Lecontia discicollis *Lec.*
Boros unicolor *Say*
* Pytho depressus *Linn.*
Pytho *planus* Oliv.
Salpingus virescens *Lec.*
* Rhinosimus viridiæneus *Rand.*

OEDEMERIDÆ.

Microtonus sericans *Lec.*
Nacerdes melanura *Linn.*
Asclera ruficollis *Say.*
puncticollis *Say.*

CEPHALOIDÆ.

Cephaloon lepturides *Newm.*

MORDELLIDÆ.

Pentaria trifasciata *Mels.*
Anaspis nigra *Hald.*
flavipennis *Hald.*
rufa *Say.*
Tomoxia bidentata *Say.*
lineella *Say.*
inclusa *Lec.*
hilaris *Say.*
Mordella melæna *Fab.*
octopunctata *Fab.*
marginata *Mels.*
serval *Say.*
oculata *Say.*
triloba *Say.*
undulata *Mels.*
discoidea *Mels.*
Mordelistena lutea *Mels.*
trifasciata *Say.*
Mordelistena lepidula *Lec.*
ornata *Mels.*
scapularis *Say.*
comata *Lec.*
aspersa *Mels.*
tosta *Lec.*
ustulata *Lec.*
nigricans *Mels.*
guttulata *Helm.*
pustulata *Mels.*
ambusta *Lec.*
unicolor *Lec.*
marginalis *Say.*
pubescens *Fab.*
liturata *Mels.*
fuscata *Mels.*
pityptera *Lec.*
attenuata *Say.*

ANTHICIDÆ.

Eurygenius murinus *Hald.*
wildii *Lec.*
Corphyra canaliculata *Lec.*
terminalis *Say.*
labiata *Say.*
lugubris *Say.*
collaris *Say.*
Xplophilus basalis *Lec.*
nebulosus *Lec.*
fasciatus *Mels.*
subfasciatus *Lec.*
piceus *Lec.*
Macratria confusa *Lec.*
murina *Fab.*
Notoxus bicolor *Say.*
Notoxus bifasciatus *Lec.*
monodon *Fab.*
anchora *Hentz.*
Tomoderus constrictus *Say.*
Anthicus obscurus *Laf.*
cinctus *Say.*
rejectus *Lec.*
floralis *Linn.*
formicarus *Goeze.*
basilaris Say.
vicinuus *Laf.*
confusus *Lec.*
cervinus *Laf.*
pubescens *Lec.*

PYROCHROIDÆ.

Pyrochroa flabellata *Fab.*
femoralis *Lec.*
Dendroides bicolor *Newm.*
Dendroides *canadensis* Latrl.
concolor *Newm.*

MELOIDÆ.

Melœ angusticollis *Say.*
americanus *Leach.*
Nemognatha nemorensis *Hentz.*
Macrobasis unicolor *Kirby.*
Epicauta trichrus *Pallas.*
Epicauta vittata *Fab.*
lemnistica *Fab.*
cinerea *Forst.*
pennsylvanica *DeG.*
Pomphopœa ænea *Say.*

RHIPIPHORIDÆ.

Myodites fasciatus *Say.*

RHYNCHITIDÆ.

Anletes ater *Lec.*
Engnamptus angustatus *Hbst.*
collaris *Lec.*
Rhinchites bicolor *Fab.*
Pterocolus ovatus *Fab.*

ATTELABIDÆ.

Attelabus analis *Ill.*
bipustulatus *Fab.*
Attelabus rhois *Bohm.*

OTIORHYNCHIDÆ.

Anametis granulatus *Say.*
grisea Horn.
Phyxelis rigidus *Say.*
Otiorhynchus sulcatus *Fab.*
ovatus *Linn.*
Cercopeus chrysorhœus *Say.*
Tanycemus confertus *Gyll.*
Pandeletejus hilaris *Hbst.*
Aphrastus tæniatus *Gyll.*
Polydrosus dorsalis *Horn.*
Scythropus elegans *Coup.*

CURCULIONIDÆ.

Sitones flavescens *Marsh.*
hispidulus *Germ.*
Lepidophorus setiger (infra).
Ithycerus noveboracensis *Forst.*
Apion decoloratum *Smith.*
herculanum *Smith.*
nigrum *Hbst.*
five spec. undetermined.
Phytonomus punctatus *Fab.*
Listronotus squamiger *Say.*
inæqualipennis *Bohm.*
candatus *Say.*
appendiculatus *Bohm.*
frontalis *Lec.*
Macrops solutus *Bohm.*
sparsus *Say.*
humilis *Gyll.*
Pissodes strobi *Peck.*
Hylobius pales *Hbst.*
Lixus terminalis *Lec.*
concavus *Say.*
musculus *Say.*
Dorytomus mucidus *Say.*
brevicollis *Lec.*
Erycus puncticollis *Lec.*
Pachyphanes amœnus *Say.*
Smicronyx morio *Dietz.*
sculpticollis *Dietz.*
Smicronyx maculatus *Dietz.*
corniculatus *Fab.*
squamulatus *Lec.*
Endalus ovalis *Lec.*
Tanysphyrus lemnæ *Fab.*
Bagous n. s.
Otidocephalus myrmex *Hbst.*
scrobicollis *Bohm.*
chevrolatii *Horn.*
lævicollis *Horn.*
* perforatus *Horn.*
Magdalis barbita *Say.*
olyra *Hbst.*
pandura *Say.*
armicollis *Say* ♀.
pallida Say ♂.
n. s.
Tachypterus quadrigibbus *Say.*
Anthonomus profundus *Lec.*
nebulosus *Lec.*
sycophanta *Walsh.*
suturalis *Lec.*
flavicornis *Bohm.*
corvulus *Lec.*
signatus *Say.*
var. pallidus *Dietz.*
musculus *Say.*
scutellatus *Gyll.*

Anthonomopsis mixtus *Lec.*
Pseudanthonomus cratægi *Walsh.*
incipiens *Dietz.*
Elleschus scanicus *Payk.*
ephippiatus *Say.*
Orchestes ephippiatus *Say.*
niger *Horn.*
armatus *Dietz.*
pallicornis *Say.*
Acalyptus carpini *Herbst.*
Prionomerus calceatus *Say.*
Piazorhinus scutellaris *Say.*
pictus *Lec.*
Thysanocnemis fraxini *Lec.*
helvolus *Lec.*
Gymnetron tetrum *Fab.*
Miarus hispidulus *Lec.*
Læmosaccus plagiatus *Fab.*
Conotrachelus juglandis *Lec.*
nenuphar *Hbst.*
retentus *Say.*
seniculus *Lec.*
elegans *Say.*
cratægi *Walsh.*
postiacus *Bohm.*
geminatus *Lec.*
cribricollis *Say.*
anaglypticus *Say.*
Rhyssematus palmacollis *Say.*
lineaticollis *Say.*
æqualis *Horn.*
* Microhyus setiger *Lec.*
Acalles sordidus *Lec.*
? *curtus* Ham.
Tyloderma foveolatum *Say.*
fragrariæ *Riley.*
æreum *Say.*
Cryptorhynchus parochus *Hbst.*
bisignatus *Say.*
minutissimus *Lec.*
fallax *Lec.*
ferratus *Say.*
Piazurus oculatus *Say.*
Piazurus subfasciatus *Lec.*
Copturus quercus *Say.*
binotatus *Lec.*
‡ minutus *Lec.*
Acoptus suturalis *Lec.*
Craponius inæqualis *Say.*
Celiodes nebulosus *Lec.*
flavicaudis *Bohm.*
acephalus *Say.*
Acallodes ventricosus *Lec.*
Ceutorhynchus rapæ *Gyll.*
sulcipennis *Lec.*
n. s.
septentrionalis *Gyll.*
Pelenomus sulcicollis *Fab.*
squamosus *Lec.*
Rhinoncus pyrrhopus *Bohm.*
Baris umbilicata *Lec.*
interstitialis *Say.*
confinis *Lec.*
Plesiobaris T. signum *Bohm.*
Glyptobaris rugicollis *Lec.*
Ampeloglypter ater *Lec.*
Madarellus undulatus *Say.*
Pseudobaris nigrina *Say.*
Trichobaris trinotata *Say.*
Centrinus picumnus *Hbst.*
scutellum-album *Say.*
Centrinopus helvinus *Casey.*
Nicentrus lineicollis *Bohm.*
decipiens *Lec.*
Limnobaris calva *Lec.*
rectirostris *Lec.*
Idiostethus tubulatus var.
strigapunctus *Hamilton.*
Balaninus obtusus *Blanchard.*
uniformis *Lec.*
nasicus *Say.*
caryæ *Horn.*
quercus *Horn.*
rectus *Say.*
proboscideus *Fab.*
confusor *Ham.*

BRENTHIDÆ.

Eupsalis minuta *Drury.*

CALANDRIDÆ.

Rhodobænus tredecimpunctatus *Ill.*
Sphenophorus sculptilis *Uhler.*
melanocephalus *Fab.*
placidus *Say.*
minimus *Hart.*
Calandra oryzæ *Linn.*
granaria *Linn.*
remotepunctata Gyll.
Dryophthorus americanus *Bedel.*
Dryophthorus *corticalis* Say.
Himatium erraus *Lec.*
conicum *Lec.*
Cossonus platalea *Say.*
corticola *Say.*
impressifrons *Bohm.*
Stenominus pallidus *Bohm.*
Phlœophagus apionides *Horn.*

SCOLYTIDÆ.

Corthylus punctatissimus *Zimm.*
Monarthrum fasciatum *Say.*
mali *Fitch.*
Gnathotrichus materiarius *Fitch.*
Pityophthorus sparsus *Lec.*
puberulus *Lec.*
Hypothenemus eruditus *West.*
dissimilis *Lec.*
Xyloterus politus *Say.*
Xyleborus dispar *Fab.*
celsus *Eich.*
Xylographus *Say.*
pubescens *Linn.*
cælatus *Eich.*
Tomicus cacographus *Lec.*
Tomicus pini *Say.*
Micracis suturalis *Lec.*
aculeata Lec.
rudis *Lec.*
Scolytus quadrispinosus *Say.*
muticus *Say.*
rugulosus *Ratz.*
n. s. (*Schwarz*)
Chramesus icoriæ *Lec.*
Phlœotribus frontalis *Oliv.*
Hylesinus opaculus *Lec.*
Cnesinus strigicollis *Lec.*
Dendroctonus terebrans *Oliv.*
Hylastes tenuis *Zimm.*

ANTHRIBIIDÆ.

Eurymycter fasciatus *Oliv.*
Allandrus n. s.
Hormiscus saltator *Lec.*
Eusphyrus walshii *Lec.*
Cratoparis lunatus *Fab.*
Brachytarsus alternatus *Say.*
tomentosus *Say.*
variegatus *Say.*

Description of New Species.

Myrmedonia schmitti.—Parallel, black, shining, basal joint of antennæ, legs and triangle on each elytron rufous, pubescence of thorax and elytra very inconspicuous, that of ventral segments coarser. Length .18 mm. Head small, shining black, alutaceous, constricted at base; antennæ brown exteriorly, loosely perfoliate from third joint, first joint nearly three times longer than second and subclavate, second thinner, third more than twice longer and clavate, 4–5 as long as second, and slightly longer than wide, 6–10 transverse and gradually incrassate, eleventh as long as preceding two, and acutely conical. Thorax twice wider than long, sides and base broadly arcuate, and with a very fine continuous margin, base suddenly depressed each side of middle causing a bisinuate and lobed appearance, shining, punctuation fine, reticulo-strigose, no dorsal impressions, except

a slight appearance of a dorsal line. Elytra as wide as thorax, not longer, suture not impressed, punctuation same as that of thorax, but coarser; sides and a basal triangle blackish, a triangle on each elytron pointing at humerus rufous as seen in certain *Aleochara*; base arcuately emarginate to admit the thorax. Abdomen as wide as elytra, sides parallel, deeply margined, first three segments concave, black shining with a few setigerous punctures; underside shining black, ventral segments punctate, but not very finely; middle coxæ widely separated, mesosternum wide and divided into three equal parts by two oblique lines deeply impressed anteriorly, but evanescent posteriorly (sub-trilobed), separated from the metasternum by an accessory piece.

Characterized from four examples without apparent sexual distinction. Occurs not infrequently near St. Vincent, where it is taken always with ants (*Formica subsericea* Say) by Rev. Jerome Schmitt, who kindly permits its description, and whose name it bears in commemoration of his zeal in micro-entomology.

Homalium flavidum.—Rufo-testaceous throughout, shining, head smooth, bipunctate between the antennæ, which are gradually incrassate from the second joint, and with the sixth and outer ones transverse. Thorax quadrate, the sides slightly narrowed from middle to apex, hind angles rectangular, disc with two longitudinal impressions not reaching apex, separated by a fine groove reaching apex, where it is slightly dilated giving the appearance of a small impression at apex more or less visible, sides impressed at middle. Elytra a little wider than thorax, slightly wider from base, outer angles strongly obtuse, finely closely punctured in approximate rows producing a longitudinal substriolate appearance. Abdomen parallel, and of the same width as the elytra, alutaceous.

Several examples occurred near St. Vincent.

Atomaria humeralis.—Elongate, depressed, plumbeous-brown, legs paler, humerus and obsolete spot near elytral apex ferruginous. Length .09 inch. Head smooth, vertex with a deep puncture. Antennæ approximate, eighth joint smaller than the ninth forming the base of the club. Thorax quadrate, convex transversely and longitudinally, finely punctulate and pubescent, margined at base. Elytra slightly widened behind, a little wider at base than thorax and three times longer, depressed, circularly impressed behind the scutellum, coarsely closely punctate, pubescence fine, short, cinereous.

Two examples taken in the evening about a wood pile; resembles but little ochracea or ephippiata; the elytra are of a similar form to those of *Xylophilus tuberculifer*, but with coarser punctures.

Lepidophorus setiger.—Piceous, antennæ and feet ferruginous, surface with small round scales, elytra with rows of setæ. Length .12-.14 inch. Head densely scaly, beak dilated towards tip, a little flattened above, densely scaly. Antennæ inserted near the tip, scape nearly as long as the outer part, extending behind the eye, which is round and very small. Thorax a little wider than long, convex, slightly narrowed anteriorly, not constricted at apex, except at sides, densely rather coarsely punctured, each puncture with a small round scale very fugitive, trivittate with fugitive whitish scales, surface piceous; scutellum not

visible. Elytra one-half wider than thorax, not depressed, subinflated, finely striate, with close, minute punctures in the bottom, intervals wide, flat, seemingly impunctate, covered with small brownish scales very inconspicuously, and each with a row of stout yellow setæ extending from base to apex, surface mottled with fugitive pale scales; color, when divested of scales, rufo-piceous to piceous; underside less densely scaly, piceous except feet and last three ventral segments ferruginous. In the ♂ the posterior part of the metasternum, first and second ventral segments are jointly concave, the third and fourth segments together are one-half longer than either of the preceding and equal to the fifth.

The vittæ of the thorax and mottling of the elytra are only seen in well preserved specimens; this is likewise the case in *lineaticollis*, which, apart from size, differs in having a longer beak, a different form of thorax, larger scales, and the elytral setæ only visible on the declivity.

Occurs near St. Vincent, taken by P. Jerome Schmitt. Virginia (Dietz).

NOTES.

CICINDELA.

C. unipunctata is rare, on paths through woody, mountainous places; *patruela* not common, on old roads and paths through hilly woodlands; 12-*guttata* not rare, along creeks; *purpurea* abundant in early Spring and in Autumn, hibernates; *punctulata* common, attracted by lights.

CARABIDÆ.

Cychrus.—All the species hibernate; *canadensis* rare, mostly taken from September to November; *elevatus* rare, Jeannette; *viduus* not uncommon here, more common near the mountains; *ridingsii*, only one example here, several at Jeannette; *andrewsi*, not rare, mostly from August to December.

Nomaretus imperfectus.—One example on mountain near St. Vincent's, by Schmitt.

Carabus.—All the species hibernate; *serratus*, not uncommon under stones in hilly woods; *limbatus*, more common in same places; *vinctus*, alluvial places under rubbish; *sylvosus*, one example; several at Jeannette.

Calosoma externum.—Not common; *frigidum*, two examples here; several near St. Vincent's; *scrutator* and *wilcoxi* come abundantly at night to electric lights in May; *calidum* less frequently.

Elaphrus cicatricosus.—Not common, grassy swamps, June.

Notiophilus.—The species are not rare, under stones and rubbish, June to November.

Pasimachus depressus.—Only three examples, May and June.

Dyschirius nigriceps, *globulosus* and *sphæricollis* occur occasionally; *hæmorrhoidalis*, abundant along streams; *hispidus*, abundant when found, not common, damp alluvial places.

Clivina impressifrons.—Not uncommon along streams, likewise *rufa* and *americana*; *bipustulata*, rare along streams.

Schizogenius lineolatus.—Not rare, banks of streams; *amphibius*, less common, under stones in streams.

Ardistomis viridis.—Only a few examples were seen, wet places.

Panagæus fasciatus.—Not uncommon in early Spring and in Autumn under stones on hills, frequently hibernates in ants' nests.

Bembidium punctatostriatum and *inæquale* common on muddy shores; *nitidulum* and *americanum* not rare; *chalceum*, only three examples; *antiquum* less rare; *nigrum*, *simplex* and *guexii*, abundant when found, but in few localities, mostly along rocky streams; *ustulatum*, two examples; this and all the preceding occur along the shores of creeks; *picipes*, abundant in the beds of hill rivulets; *postremum*, common on sandy shore of river, June and July; *dentellum*, abundant in alluvial places in grass and rubbish; *postfasciatum*, not common, gregarious, on mud flats along streams; *patruele*, common; *variegatum* and *versicolor* less common, and all along streams; *sulcatum*, not common, in grass about ponds and swamps; *affine* and *assimile*, abundant in grassy swamps and alluvium; *quadrimaculatum*, all situations; *pedicellatum*, not common, wet grassy places; *lævigatum*, sandy beaches, June and July.

Tachys proximus, *scitulus* and *coruscus*, humid places; *lævis*, not rare; *nanus* and *flavicauda* under bark; *vivax*, *capax*, *xanthopus*, *incurvus*, *nebulosus* and an indeterminate, occur along the shores of streams and in nearly all humid places.

Pericompsus ephippiatus.—Common on mud flats.

Patrobus longicornis.—All wet places.

Myas coracinus.—Not uncommon on hills in woods; *cyanescens*, two examples: more frequent near the mountains.

Pterostichus adoxus Say.—Common, breeds in decaying logs; *rostratus*, same habits, only four examples, more common towards the mountains; *vinctus*, not common, found in colonies, woody hills; *unicolor*, only one example on a high ridge; *apalachius*, hillside rivulets, July to October; *honestus* breeds in decaying wood; *obscurus*, not common, under stones on hills; *lachrimosus*, not common, breeds in rotting wood; *coracinus* more common, moist woodland hills; *stygicus*, everywhere; *relictus*, local, slaty, moist ravines and hills; *mœstus*, not rare, breeds in rotting logs; *sculptus*, two examples under stones, common along the mountains; *hamiltoni*, under stones on hills; *sayi*, rank herbage on alluvial places; *lucublandus*, everywhere; *caudicalis*, *luctuosus*, under rubbish in damp places; *corvinus*, breeds in swamps; *tartaricus*, two examples at lights; *purpuratus*, abundant where found, rich hills, September and April; *mutus*, under stones in woods and fields; *erythropus*, not rare, various places; *patruelis*, *femoralis*, not common, in primitive swamps.

Evarthrus sigillatus, *sodalis*, under rubbish and stones, not rare.

Avara avida, *exarata*, in same places; *fulvipes* local, abundant when found, September; *angustata*, rare, under rubbish; *impuncticollis*, everywhere; *basillaris*, two examples; *cupreolata*, not rare, grassy places; *fallax*, not rare in localities; *obesa*, not common, under stones; *rubrica*, three examples; *musculus*, not common.

Diplochila major.—Two examples at light.

Dicælus dilatatus var. *dejeani*, not rare; *purpuratus*, *sculptilis*, *ovalis* and *elongatus* are not uncommon under stones; *ambiguus*, one example; also at Jeannette; *teter*, common under stones; *politus*, abundant under stones and bark.

Badister notatus.—Three examples; *pulchellus*, two examples at lights.

Calathus impunctatus.—Three examples; common near the mountains.

Platynus caudatus.—One example, Jeannette; *hypolithus*, *angustatus*, about streams under stones, etc.; *decens*, not rare, wet places; *sinuatus*, near streams about trees; *reflexus*, hillside rivulets; *parmarginatus*, local, in the bed of a dry spring run; *anchomenoides*, under alluvial rubbish and grass; *obscurus*, rare, Jeannette; *atratus*, about wet places; *melanarius*, alluvial places; *cupripennis*, everywhere, but not abundant; *excavatus*, not rare, on grassy places near streams; *ferreus*, not rare, all localities; *nutans*, two examples; *octopunctatus*, everywhere, but not abundant; *placidus*, gregarious, grassy places about fences, etc.; *bogemanni*, in houses, about lumber and on the streets; *quadripunctatus*, not common, wet places; *æruginosus*, not rare, grassy banks of streams; *crenistriatus*, not abundant, under stones; *punctiformis*, every place, under stones, etc.; *retractus*, two examples; *picipennis*, under rubbish, etc., on low ground.

Olisthopus parmatus.—Two examples, in swamp.

Atranus pubescens.—Humid places under rubbish.

Leptotrachelus dorsalis.—Jeannette.

Casnonia pennsylvanica.—Not abundant, everywhere.

Galerita janus.—Gregarious, under stones, etc.

Tetragonoderus fasciatus.—Not common, near water.

Lebia grandis, *atriventris*, common, hibernates; *viridis*, *pumilla*, abundant, on bushes, etc.; *viridipennis*, *lobulata*, less common; *ornata* Say, several varieties, common; *fuscata*, *furcata*, rare, on herbage in valleys; *scapularis*, not rare on herbage on low ground; *bivittata*, not common.

Coptodera ærata.—Rare, about piled wood.

Dromius piceus.—Under bark of standing trees, etc.

Apristus cordicollis.—Two examples.

Blechrus pusio.—Twenty examples taken once.

Metabletus americanus.—About stumps and logs.

Plochionus timidus.—Two examples.

Pinacodera limbata var. *fuscata* and *platicollis*, about standing trees under bark.

Cymindis americana, *pilosa*, not rare, under stones; *neglecta*, not common, about logs, gregarious.

Apenes lucida.—Five examples, under stones, May; *sinuata*, not rare, April to November, under rubbish.

Brachinus americanus.—Three examples; ? *perplexus*, common along streams; ? *alternans*, ? *cordicollis*, of each two examples.

Chlænius erythropus.—One example on high hill; *sericeus*, near water; *laticollis*, *diffinis*, under stones on hills; *platyderus*, two examples: *æstivus*, not rare; *prasinus*, river beach; *leucoscelis*, not common; *nemoralis*, occasional, under stones on hills; *tricolor*, more common, same habitat; *pennsylvanicus* and varieties, everywhere; *impunctifrons*, not abundant, various places; *niger*, rare, near St. Vincent; *tomentosus*, about fences and stone-piles.

Anomoglossus emarginatus.—Common; *pusillus*, grassy places about water.

Brachylobus lithophilus.—Same habitat, less common.

Lachnocrepis parallelus.—Two examples in a swamp.

Oodes amaroides.—Wet places, not common.

Geopinus incrassatus.—Rather scarce, sandy shores.

Cratacanthus dubius.—Not abundant, everywhere.

Agonoderus lineola.—Three examples, sandy beach; *pallipes* and var. *comma*, everywhere; *partitarius*, *pauperculus*, not common.

Gynandropus hylacis.—Under bark of standing trees.

Harpalus dichrous, *vulpeculus*, common, under stones on hills; *autumnalis*, not common; *megacephalus*, *spadiceus*, *fallax*, rare; *herbivagus*, everywhere; *viduus*, not rare, under stones on hills, matures in Autumn; *basilaris*, two examples.

Selenophorus palliatus.—Rare, sandy beaches; *gagatinus*, not rare; *opalinus*, occasional on river beach; *ellipticus* var. *granarius*, not common, under stones on beach, May.

Stenolophus fuliginosus.—Not rare; *plebeius*, wet places in grass; *humidus*, abundant, same habitat; *conjunctus* (red thorax), everywhere; var. with black thorax, in grass about fences; *ochropezus*, everywhere; *alternans*, rare, semi-aquatic, wet sandy places along streams.

Acupalpus carus.—By sweeping in marshes.

Bradycellus rupestris and varieties, everywhere.

Tachycellus kirbyi.—In a swamp soon to be drained; *atrimedius*, humid places; *badiipennis*, less abundant.

Anisodactylus rusticus.—Type form, everywhere; *carbonarius*, common; *interpunctatus*, two examples; *agricola*, *harrisii*, *nigerrimus*, moderately abundant; *nigrita*, three examples; *melanopus*, not common; *discoideus*, *baltimorensis*, alluvial places and near water; *piceus*, three examples; *agilis*, four examples; *terminalis*, *nitidipennis*, everywhere; *cænus*, two examples at light; *lugubris*, *interstitialis*, abundant; *sericeus*, occasionally at light.

HALIPLIDÆ.

The species have not been collected exhaustively; *Haliplus ruficollis* and *Cnemidotus 12-punctatus* are frequent.

DYTISCIDÆ.

The Dytiscidæ have not been exhaustively collected, and many more species will reward the collector who has suitable opportunities. The species tabulated are mostly common, unless otherwise noted.

Cœlambus impressopunctatus and *Deronectes griseostriatus* were taken but once: *Hydroporus* var. *pulcher*, two examples; *vitiosus* and *oblongus* are seemingly rare, the latter also occurs at St. Vincent; *Agabus stagninus*, four examples at once in a swamp; *tæniolatus*, three examples in different swamps; *Colymbetes sculptilis* seems rare.

GYRINIDÆ.

The diagnosis of the species of *Gyrinus* is more or less opinionative, and others may occur here.

HYDROPHILIDÆ.

Other species than those listed await a collector with greater opportunities.

Ochthebius benefossus, *foveicollis*, occurred near St. Vincent: *Tropisternus striolatus*, three examples once; *Philydrus hamiltoni*, not common: *Cymbiodyta blanchardi*, spring runs on hillsides; *Hydrobius globosus*, rare, on stones in

running water; *Creniphilus monticola*, near St. Vincent; *Cercyon unipunctatus*, not rare, under decaying carcasses; *prætextatus*, in rotting fungi; *navicularis*, rare, in drying fungi; *pubescens*, common in dry horse dung; *Cryptorhopleurum minutum*, abundant under decaying vegetation, etc.

LEPTINIDÆ.

Leptinus testaceus.—Twice in old leaves in November; frequent near St. Vincent, where it is taken by Prof. Schmitt, mostly by sifting.

SILPHIDÆ.

Necrophorus americanus.—One example; *pustulatus*, two examples; the other species are common.

Silpha lapponica.—Jeannette; this species seems to be spreading southward: the other species are common.

Pinodytes cryptophagoides.—Taken here once, near St. Vincent frequently by sifting for ants; *hamiltoni*, only three examples of this rare beetle, which is blind, occurred here; a few others were taken near St. Vincent.

Choleva.—All the species are common on carcasses, at putrid sap, etc.

Prionochæta opaca.—At putrid sap, fungi, etc., April.

Ptomophagus parasitus.—April, with large ants under stones; *brachypterus*, St. Vincent, by sifting.

Colenis impunctata.—About decaying vegetable matter.

Liodes globosa, *polita*, not common, in fungi; often in clusters under bark of trees in April; *discolor*, not frequent; *basalis*, not rare, in soft fungus on logs, May; *obsoleta*, not common, under bark, May.

Agathidium oniscoides, *exiguum*, common on green fungus under bark; *politum*, not frequent, in decaying mushrooms, September to October.

SCYDMÆNIDÆ and PSELAPHIDÆ.

By P. JEROME SCHMITT, St. Vincent, College, Pa.

These families have been placed in charge of Prof. Schmitt, and his very valuable collection notes are given in full. All additions of my own are inclosed in [ ].

Euthiodes cristata Brend.—Obtained by sifting layers of old leaves on the Chestnut Ridge, Cambria County. Specimens in Dr. Brendel's collection.

[**Cephennium corporosum** Lec.—Several examples were taken at various times in April on the underside of boards on damp grassy places.]

Cholerus zimmermanni Schaum.—Rarely found under bark and in the woods of decayed trees, in Spring and Autumn. Ten specimens.

Eumicrus motschulskii Lec.—Sifted from old leaves; sixteen specimens taken.

Eumicrus caseyi Brend.—Found in very rotten wood and under old leaves, usually in small companies; total number of specimens taken, seventy. It differs from *Eumicrus motschulskii* and *vestalis*, and the European *tarsatus* both in general habitus and by its short posterior coxæ.

Eumicrus n. sp.—This is a small species, 1.2 mm. long, resembling a miniature *Cholerus zimmermanni* in appearance, and more or less also in sculpture, but has the long posterior coxæ of *Eumicrus*. A colony of twenty-two specimens was found Dec. 26, 1894, in the black, accumulated, decayed material of a partially hollow, though still living, oak that had been broken down by a recent storm.

Brachycepsis subpunctatus Lec.—Thirteen specimens, found at different times among decaying leaves.

Brachycepsis mariæ Lec.—Taken more abundantly (thirty specimens) with the last, also obtained from Cambria County.

Brachycepsis n. sp. (teste Dr. Brendel)—Very scarce, also taken with the last. The antennal club of this consists of three large joints.

Brachycepsis cribrarius Lec.—Eight specimens collected with the sieve, and two on Dec. 26, 1894, with the above-mentioned *Eumicrus* sp.

[**Scydmænus fossiger** Lec.—Abundant under stones, etc., March to April.]

Scydmænus from *capillosulus* to *minimus* were all taken at various times with the sieve, or found in dead wood, or under stones; none at any time in the company of ants. No notes were made of the captures of the different species. For the names I am indebted to the kindness of Dr. Brendel.

Scydmænus minimus Brend.—Found in very friable, rottenwood in April, usually in small colonies.

Scydmænus sp. long. .95 mm.—Probably not described, of the form of *ovithorax* Brend. Yellowish red; the second joint of antennæ the largest, the seventh larger than its neighbors, club 3-jointed; frontal margin without impressed lines. One specimen.

Scydmænus clavipes Say.—Black, slightly larger than *Sc. clavatus*. Head and elytra very shining, and with but few scattered long hairs; the head lacks the usual basal tufts of coarse hair, whereas the thorax is densely, almost completely, covered with long, yellowish brown, bristling hair, giving it a striking, shaggy appearance. Four examples sifted in Cambria County, April.

PSELAPHIDÆ.

Faronus tolulæ Lec.—Very scarce. Altogether but six specimens have been taken on the Chestnut Ridge, by sifting layers of old leaves during Winter.

Rhexius insculptus Lec.—Taken but rarely in dead wood under bark, or under stones, and more abundantly with the sweeping-net in a grassy wood in Spring.

Rhexius schmitti Brend.—A single specimen found under a stone on the Chestnut Ridge in May.

Rhexius canaliculatus Lec.—Occurs abundantly in moss on the Chestnut Ridge, also in North Carolina in Autumn and Spring.

Rhexidius trogasteroides Brend.—Six males and one female have been sifted from deep layers of old leaves on the Chestnut Ridge during Winter.

Trimium parvulum Lec.—A colony of twenty to thirty specimens were, on one occasion, taken in a very rotten oak stump in April, and a single individual last July also in rotten wood.

[**Trimium thoracicum** Brend.—Rare, six examples found in very rotten wood, April 20th.]

Trimium sp.—A single specimen, undescribed, with very widely separated occipital foveæ.

Euplectus crinitus Lec.—Scarce; found under bark of dead trees, April, May.

Euplectus interruptus Lec.—Not very abundant in rotten logs and stumps, in Spring.

Euplectus confluens Lec.—Abundant in Autumn and Spring in rotten wood; varies in the sculpture of the head and the shape of the ventral sexual marks of the male.

Euplectus elongatus Brend.—Rather scarce; found with *confluens*.

Euplectus pertenuis Casey.—A dozen specimens taken with *Trimium parvulum*; others found with *Euplectus confluens* in Spring.

Euplectus leviceps Casey.—Three examples from Cambria County, Pa., April.

Euplectus sp.—Near *confluens*, but smaller, with more slender and graceful antennæ and different ventral, sexual marks in the male; several ♂ and ♀ specimens found in dead wood in Winter; a pair Dec. 26, 1894.

Trimioplectus obsoletus Brend.—Scarce; only three specimens, two of which were obtained Dec. 26, 1894.

Trimioplectus ruficeps Lec.—Four examples from rotten, red oak log, April, 1895.

Trimioplectus arcuatus Lec.—One specimen so named by Dr. Brendel.

Actium sp.—A single specimen, referred to this genus by Dr. Brendel, which was collected in Cambria County.

Eutyphlus similis Lec.—Very abundantly obtained from under old leaves on the Chestnut Ridge in Winter; three to four hundred specimens.

[**Thesium cavifrons** Lec.—Occurs under stones, etc., April.]

Arianops amblyoponica Brend.—Although twenty specimens have been collected in four years this is a very scarce insect, found on the Chestnut Ridge. The first pair ever seen by me walked about among ants, and one of them escaped me in one of their galleries. Since then it has usually been found under stones rather deeply imbedded in the ground, and apparently not in company of ants, though always in their immediate neighborhood. The described type is a ♀. Found from July 20th to October.

Batrisus schaumii Aubé.—From fifteen to twenty specimens have been found in rotten stumps during Spring.

Batrisus riparius Say.—Found with the last and in about equal number.

Batrisus scabriceps Lec.—Taken but once, three ♀ and nine ♂ specimens, Dec. 26, 1894, in the same material from which *Enmicrus* sp. and *Trimeoplectus obsoletus* were obtained.

Batrisus bistriatus Lec.—Abundant, but exclusively taken here in the nests of *Formica subsericea* Say or in the mixed colonies of this ant and *F. subintegra* Em. Does not occur on the Chestnut Ridge.

Batrisus frontalis Lec.—A single pair found under a log on the Chestnut Ridge, May.

Batrisus globosus Lec.—Not rare. Here it occurs in very rotten and friable oak logs or stumps and under bark in April, and not with ants; but on the Chestnut Ridge—during May and the Summer—I have looked for it and found it only in the hills of *Formica exsectoides* Forel.; in Cambria County it has been taken with *Formica subsericea* Say on several occasions.

Batrisus punctifrons Casey.—Has not occurred here, but quite often on the Chestnut Ridge and in Cambria County, as well as in Elk County, under layers of old leaves and sometimes under bark or in logs. It is sometimes, accidentally perhaps, met with in the galleries of *Camponotus pennsylvanicus* DeGeer with *Ptomophagus brachyderus* Lec.

Batrisus furcatus Brend.—Found in logs or among the leaves alongside of them; April, May. Scarce, but ten specimens collected in four years.

Batrisus denticollis Casey.—This is abundant during Spring and Autumn under leaves and stones in some woods, apparently preferring some localities to others. Numerous specimens.

Batrisus virginiæ Casey.—This ought, perhaps, not to be included in this list; a single specimen, now destroyed, has so been named for me.

Batrisus foveicornis Casey.—Of rare occurrence in rotten wood in Spring.

Batrisus striatus Lec. (*cephalotes* Casey)—Very rarely found here in stumps or under old leaves.

Bryaxis.—The species of this genus are not often met with here, only from thirty to forty individuals have been obtained in four years, the great majority of which have been sifted from layers of dead leaves in grassy woods, and the others were found under stones. All were taken during Spring, and mounted, but no record was made of them. *B. perforata* was taken with the sweeping net (two specimens) in a meadow on the Chestnut Ridge in May, 1894.

Bryaxis semirugosa Brend.—But two specimens have occurred to me; it is very coarsely punctured. [Described by Dr. Brendel in "Entomological News," vol. vi, 183. The locality given by Dr. Brendel is erroneous, and should have been western Alleghanies.]

Rybaxis conjuncta Lec.—Single specimens and pairs of this are not seldom obtained with the sieve, or found under stones during Spring, it cannot, however, be said to be abundant.

Decarthron abnorme Lec.—A dozen specimens have been collected at different times with the sieve, or found attached to the lower side of stones, Spring.

Decarthron n. sp. (teste Dr. Brendel)—One pair found under a stone on the Chestnut Ridge in October, and another pair sifted from among old leaves in Cambria County, in Spring.

Bythinus carinatus Brend.—Abundant on the Chestnut Ridge and in Cambria County under leaves; Autumn, Winter and Spring. Have not met it except on the mountains; two hundred and fifty specimens.

Bythinus (subgenus *Machærites*) **tychoides** Brend.—One specimen sifted from leaves on the Chestnut Ridge, in May.

Tychus minor Lec.—Var.? three ♀ and nine ♂ specimens of this have been collected in Spring and in Autumn from under leaves or under stones. It is hardly LeConte's *minor*. All the males have a conspicuous T-shaped tubercle at the middle of the mesosternum.

Tychus testaceus Casey.—Two males and ten females. Found with the last, mesosternum of male simple.

Ctenistes piceus and **consobrinus** Lec.—Abundantly taken under stones with *Batrisus denticollis*, but especially so with the sweeping net in grassy woods; twenty-six males and thirty-six females, and forty other specimens not yet separated with regard to sex. The larger individuals I mark *piceus*, the smaller ones *consobrinus*—there does not seem to exist a structural character by which they can be separated as two recognizable valid species. *Ct. zimmermanni*, from North Carolina, has the palpal appendages distinctly separated from, and articulating with, the globose portion of the palpal joints.

Ceophyllus monilis Lec.—Found, not rarely, with colonies of *Lasius aphidicola* Walsh, in Spring, and sometimes in Autumn from August 10th onward.

[Tmesiphorus costalis Lec.—Only two examples.]

Tmesiphorus carinatus Say.—One female found under bark in Spring.

[Cedius ziegleri Lec.—A few examples once.]

Cedius spinosus Lec.—In very rotten stumps during Spring and Fall. Ten specimens have been found. This may not be LeConte's *spinosus;* its first dorsal segment of the abdomen has short, yet quite distinct carinæ, which are, in some specimens, even almost half as long as the segment. Long. 1.8 mm.–1.9 mm.

Tyrus humeralis Aubé.—Not often found under bark or sifted from leaves.

Adranes cœcus Lec.—Has occurred but once with me in a colony of *Lasius aphidicola* early in April. Five specimens.

STAPHYLINIDÆ.

Falagria cingulata and *F. dissecta* occur in March and April on the underside of stones on grassy slopes. An undescribed species resembling *cingulata* is found about old stumps.

Hoplandria lateralis is abundant in decaying vegetable substances; an undescribed species, received also from Ohio and Kansas, is found under stones along streams feeding on dead animal substances. Length .10–.12 inch. brown, basal half of elytra and abdomen, except segments 5 and 6, yellowish.

Homalota 3-maculata feeds on various fungi; *ambigua*, October and November, in decaying fungi; *Amischa analis* and *Colpodota lividipennis* mostly under bark; *Homalota pedicularis*, October, in dry, old cow droppings; an elongate, very depressed form with sculptured thorax is abundant under bark of *robiniæ;* a minute, depressed, elongated species .07 inch. long, with impressed thorax lines under the outside bark of pine and feeds on the dry resin; several species were not collected.

Lomechusa cava occurred once, but frequently at St. Vincent with ants.

Tachyusa cavicollis, *gracillima*, both about swamps.

Myrmedonia schmitti, with ants, St. Vincent, not common; *rudis*, one example.

Aleochara lata and bimaculata, common; *brachypterus*, not frequent; *nitida*, common; the larvæ are parasitic in dipterous larvæ living in droppings of cattle, and the beetles develop in their puparіums; two small species undetermined.

Oxypoda sagulata, decaying vegetable matter.

Bolitochara picta, *blanchardi* ("Can. Ent." vol. xxv, p. 276), abundant.

Gyrophæna.—All the species abound in mushrooms.

Dinopsis americana.—Very wet places, common.

Acylophorus.—Both species are common in wet places.

Heterothops fumigatus.—Under rubbish, etc., in damp places.

Quedius fulgidus.—Two varieties, one piceous, the other with rufous elytra; not rare; *peregrinus* is arboreal in habitat; the other species occur under rubbish or the bark of trees, not rare.

Listotrophus capitatus.—One example, St. Vincent.

Staphylinus badipes.—Not common; *vulpinus*, rare; *maculosus* and *cinnamopterus*, common; *mysticus* and *comes* occur rarely in fungus; *violaceus*, not rare under bark.

Ocypus ater.—Not common under stones, etc.

Belonuchus formosus.—In mushrooms, etc.

Philonthus politus and asper.—Both abundant, occur together, and require care to separate; *furvus*, rare; *lætulus* Say, common in fungi; *hepaticus*, rare; *palliatus*, rare; *debilis*, common in fungus; *varians*, *thoracicus*, *fusiformis* and *micans* are rare; *lomatus* and *brunneus*, common; *cyanipennis* and *lætulus*, common in fungi; *quediinus*, one example only; *sordidus* not common; *nigritulus* and *microphthalmus*, abundant in wet places; *apicalis*, *viridanus*, of each one example; *confertus*, not rare, near streams.

Actobius cinerascens.—Not rare, near streams; *fraterculus*, rare, wet places; *sobrinus*, abundant in wet places; *parcus*, rare, under bark; *pæderoides*, common about streams; *jocosus*, rare, in wet places.

Xantholinus fulgidus.—Three examples: the other species are common.

Leptacinus longicollis.—Not common, under bark.

Baptolinus longiceps.—Rare under bark here and among the mountains.

Stenus.—Besides the species listed, there are several undetermined.

Euæsthetus americanus.—Swampy places, minute.

Edaphus nitidus.—Not common, St. Vincent.

Stictocranius puncticeps.—Not rare, under leaves.

Cryptobium badium.—Not rare; *bicolor*, common; *pallipes* and *latebricola*, not rare, under bark; *cribratum*, wet places.

Lathrobium grande.—Under rubbish and leaves, etc., on low ground; *punctulatum*, not rare; *angulare*, rare, in swamps; *bicolor*, not rare; *armatum*, common; the other species are not common.

Stilicus.—The species are common, under bark, etc.; *biarmatus* is frequent in early Spring under stones, etc., on grassy hillsides.

Androchara corticina.—Common on the ground under rubbish, sometimes under bark; *Trachysectus confluens* is common under bark.

Pinophilus latipes.—Not abundant, under rubbish in damp places, under bark.

Tachinus memnonius, *flaripennis*, *luridus*, *fimbriatus* and *pallipes*, abundant in decaying fungi and rejectamenta of herbivorous animals; *repandus* is rare, in swamps; *limbatus*, low grounds under rubbish; *fumipennis*, not uncommon, various places; *nitiduloides*, twice, gregarious like the other species.

Tachyporus nanus and nitidulus are common under stones on grassy hillsides in early Spring: the other species are not uncommon.

Cilea silphoides.—Gregarious, occurred once, also at St. Vincent.

Conurus littoreus, knoxii and scriptus not common; the other species are abundant.

Boletobius niger is rare; the other species are fairly common, all feeding on fungi; var. *gentilis* is rare.

Bryopus rufescens.—Common under things in early Spring.

Mycetoporus humidus Say, not rare, decaying vegetation.

Olisthærus substriatus, rare, under bark.

Megalops cœlatus, rare, under bark, under small fungi.

Oxyporus.—The species all feed on fungi; *stygicus*, *lepidus*, *4-maculatus* and *occipitalis* are less common; a black headed variety of *4-maculatus* occurs at St. Vincent.

Osorius latipes, not common, here and at St. Vincent.

Bledius semiferrugineus and annularis, not common, along streams; *stabilis* common on grassy banks of streams; *emarginatus* excessively abundant.

Platystethus americanus, common under dung, rubbish, etc.

Oxytelus rugosus, rare: *pennsylvanicus*, *insignitus*, *exiguus* and *suspectus* common; *placusinus*, with ants, St. Vincent.
Trogophlœus.—All the species are common about streams and ponds.
Apocellus sphæricollis and bicolor rare.
Thinobius sp. .02 long, not uncommon, muddy swamps.
Geodromicus plagiatus, common; *strictus* less common, both in wet rocky places; between the layers of stone, etc.
Lesteva pallipes, common along streams.
Acidota subcarinata, common here; St. Vincent.
Arpedium angulare, not common; *cribratum*, St. Vincent.
Trigonodemus striatus, not rare in decaying fungus, November.
Larithmæum sordidum, rare, under leaves.
Olophrum obtectum, common, wet grassy places.
Homalium foraminosum, St. Vincent; *humerosum*, rare; *punctiventre*, common on *crataegus* blossoms; *rufipes*, not common; *flavidum*, St. Vincent.
Anthobium convexum, common on blossoms; *hornii*, not uncommon. I take it likewise in Florida. Length .04–.05 inch.
Protinus atomarius, not rare, under bark.
Lispinus tenellus, St. Vincent, not common.
Glyptoma costale, under bark, common.
Triga picipennis, not rare.
Eleusis pallida, in colonies under bark, not common; *nigrella*, two examples under bark in a mountainous place.
Siagonum americanum and punctatum not common.

TRICHOPTERYGIDÆ and SCAPHIDIIDÆ.

Many species of these families have not been collected. *Limulodes paradoxus* is frequent at St. Vincent with ants.

PHALACRIDÆ.

Phalacrus politus, breeds in corn ergot.
Olibrus pallipes and semistriatus on bloom of Solidago, etc.
Stilbus apicalis and nitidus under rubbish.

CORYLOPHIDÆ.

Sanicum fasciatum, lunatum, under the epiderm of bark in early Spring; the species of the other genera were not common, occurring mostly under things.

COCCINELLIDÆ.

Hippodamia 15-maculata and 13-punctata, less common.
Coccinella affinis, rare.
Mysia pullata, not common.
Exochomus marginipennis, on pine and spruce.
Cryptognatha pusilla, common on walnut and hickory.
Brachyacantha 4-punctata, not common.
Hyperaspis fimbriolata, not rare; *discreta* rare; the other species are common.
Scymnus.—The species are common.

ENDOMYCHIDÆ.

Symbiotes ulkei and **minor**, in humous wood, under bark, and by sweeping, both scarce.
Mycetæa hirta, not common.
Rhanis unicolor, in old wood, common.
Phymaphora pulchella, in wood and bark, less common.
Lycoperdina ferruginea, breeds in puff balls on logs.
Mycetina testacea, St. Vincent.

EROTYLIDÆ.

Languria bicolor and **lecontei** are not common.
Plœosoma punctatum, under bark on trees, May.
Dacne 4-maculata, under bark, etc., not rare.
Megalodacne fasciata, rather rare.
Ischyrus 4-punctatus, in boletus, not common.
Micotretus sanguinipennis and **pulchra**, not rare.
Tritoma mimetica and **angularis** and the black variety of *humeralis* are not common, the other species are abundant, all in mushrooms.

COLYDIIDÆ.

Synchita fuliginosa, under bark, March; *parvula*, rare.
Cicones marginalis, rare, under bark.
Ditoma and **coxelus**, not common, under bark.
Aulonium parallelopipedum, not rare.
Colydium lineola, not common, bores in trees.
Penthelispa hæmatodes, four examples; *reflexa*, St. Vincent.
Pycnomerus sulcicollis, St. Vincent.
Bothrideres geminatus, not common, under bark.
Mychocerus depressus, found once in numbers on small white mould or fungus under bark; resembles a *Histeride*.

RHYSODIDÆ.

Rhysodes exaratus, under bark, not common.
Clinidium sculptile, breeds in rotting wood.

CUCUJIDÆ.

Silvanus surinamensis, common in stones; the other species are common under bark, *advena* likewise occurring in merchandise.
Nausibius clavicornis, not common, in houses or under bark.
Pediacus depressus, under bark, not common.
Cucujus clavipes, under bark of many species of trees.
Læmophlœus biguttatus, fasciatus and **testaceus**, common under the epiderm of bark, etc.; *adustus* rare under bark; *convexulus* and *rotundicollis*, rare, under leaves.
Dendrophagus cygnæi, under bark in mountainous places, rare.
Brontes dubius, common: *debilis*, rare.

CRYPTOPHAGIDÆ.

Telmatophilus americanus, not rare, under bark.

Loberus impressus, not rare, under bark.

Tomarus pulchellus, on the ground under things, April.

Antherophagus ochraceus, on flowers.

Cryptophagus.—The species are not rare on cryptogams and fungi; several others were not collected.

Cænoscelis ferruginea, not rare.

Atomaria ochracea, not common; *ephippiata*, common on the ground among herbage.

MYCETOPHAGIDÆ.

Mycetophagus.—The species are common, except *obsoletus*.

Triphyllus humeralis, in fungus; *Typhæa fumata* in granaries, etc., and the species of *Litargus*, except *nebulosus*, in fungus and by beating, are common.

Diplocœlus brunneus, under bark, not common.

DERMESTIDÆ.

Byturus unicolor, on flowers; all the species of *Dermestes* are common except *pulchra*, of which an example occurred here and one at St. Vincent; *rattus*, a very small var. of *caninus*, was only taken in early Spring on dead snakes impaled on thorns by butcher birds the previous Autumn.

Attagenus piceus, in houses, on flowers, etc.; *pellio*, only two examples.

Dearthrus longulus and Cryptorhopalum triste, occasional on flowers and by beating.

HISTERIDÆ.

Hololepta lucida and fossularis, under elm and locust bark.

Hister planipes, six examples once with ants, April; *barrisii*, one example; *merdarius*, not common; *interruptus*, *marginicollis* and *cognatus* not rare; *fœdatus*, *abbreviatus*, *depurator*, *furtivus*, *sexdecimstriatus* and *americanus* are very common; *cirilis* occurs under bark mostly, and is rare here, but more common near the mountains; *servus*, rather rare; *bimaculatus*, three examples; *subrotundus* and *vernus* common under stones, April; *carolinus and lecontei*, common under bark; *parallelus* and *coarctus*, common under pine bark; *basalis*, St. Vincent.

Epierus pulicarius, not rare.

Tribalus americanus, not common.

Hetærius brunnipennis, not common, with ants, April.

Onthophilus alternatus, rare, here and St. Vincent; var. *nodatus*, three examples in dried human fæces.

Dendrophilus punctulatus, not common, under bark.

Paromalus æqualis, estriatus and bistriatus, common under bark; *conjunctus*, not common, under sterc. bovin.; *seminulum*, when found, abundant.

Carcinops 14-striatus, occasional about decomposing animal and vegetable matter.

Saprinus rotundatus, not common, here and St. Vincent; *assimilis*, common; *fraternus*, common, sandy shores; *fitchii*, not common, sandy places.

Plegaderus transversus, not rare, under bark.

Teretrius americanus, not common, under bark.
Bacanius tantillus, not rare, under bark.
Acritus exiguus, common, under bark of locust.
Aeletes politus and **simplex**, not common, under bark.

NITIDULIDÆ.

Brachypterus urticæ, common on bloom of Urtica.
Cercus abdominalis, common on blossoms; *pennatus*, on *Sambucus rubens*, April.
Carpophilus hemipterus, common in foreign fruits; the other species are not rare, at sap, April, and on blossoms.
Colastus morio, rare: *unicolor*, rare: *semitectus* not rare, April, at sap: *truncatus*, common, on flowers.
Epuræa helvola and **rufa**, common in fungus; *erichsoni* and *avara*, less common; *rufida*, common, by beating dead leaves, etc.; *labilis*, common on flowers; *truncatella* in fungus, Alleghanies.
Nitidula bipunctata, about cured meat; *rufipes*, not rare by beating; *zicczac*, mostly on dead birds, etc., not common.
Stelidota geminata, very common in rotting fruit, etc.; *octomaculata*, common under stones, etc.
Prometopia 6-maculata, not rare, under bark.
Soronia undulata, two examples, in a swamp; *substriata*, two examples under maple bark, May.
Perthalycra murrayi, one example.
Pocadius helvolus, common in growing puff balls, August.
Meligethes mutatus, very common on *Urtica*, etc., June.
Oxycnemus histrina, not rare, in putrid fungus, September.
Amphicrossus ciliatus, not rare, at putrid sap, April.
Cychramus adustus, not common, by beating.
Cryptarcha ampla, common; *concinna*, less common.
Ips obtusus, rare, here and at St. Vincent; *sanguinolentus* common, and *confluentus* less common, both at sap, April.
Rhizophagus cylindricus, bipunctatus and **remotus** common under the epiderm and about bark; *minutus* var. frequent at sap in April; this may really be an undescribed species with an obscure rufous vitta on each elytron, likewise occurring in New York and in North Carolina.

LATRIDIIDÆ.

Stephostethus liratus, common by beating.
Latridius minutus, common under bark, April to May; *opaculus*, not common; *filiformis*, occasional in the débris of imported raisins, etc.
Corticaria elongata, not common, by beating; *cavicollis* and *distinguenda*, common, by beating; *picta*, common, by beating grass in wet places.

TROGOSITIDÆ.

Nemosoma cylindricum, rare, in dead trees.
Alindria cylindrica, common, boring dead trees.
Tenebrioides mauritanicus, common in granaries; *corticalis*, common; var. *dubius* not common; *americanus*, common under bark; *nanus*, not common; *bimaculatus*, rare here; more common at St. Vincent.

Ostoma ferrugineum, not rare, Alleghanies.
Thymalus fulgidus, rare here and at St. Vincent.
Grynocharis, not rare, about trees with rough bark.

MONOTOMIDÆ.

Monotoma, the species are rare, by sweeping.
Europs pallipennis, not common, sappy stumps, April.
Bactridium ephippigerum, common under the epiderm of bark; *striolatum*, less common; *cavicolle*, rare, at sap, April to May.

DEROTONTIDÆ.

Derodontus maculatus, gregarious, not common, under bark of standing trees, September to December.

BYRRHIDÆ.

Nosodendron unicolor, two examples here, others near St. Vincent; *Byrrhus geminatus* and *murinus*, both rare, St. Vincent; *Limnichus punctatus*, St. Vincent.

PARNIDÆ.

Psephenus lecontei, abundant at St. Vincent; *Dryops lithophilus*, *fastigiatus*, both common in rocky creeks; *elmis*, *4-notatus*, *divergens*; *Stenelmis crenatus*, *vittipennis*; *Macronychus glabratus* and *Ancyronyx variegatus*; all the above occur here and at St. Vincent.

HETEROCERIDÆ.

Heterocerus.—All the species are common except *schwarzi*, which occurs on the banks of muddy ditches.

DASCYLLIDÆ.

Eurypogon niger and Anchytarsus bicolor, both rare; *Ptylodactyla serricollis*, common at lights and near water; *Eucinetus testaceus* and *morio*, rare in rotten wood under bark; *Ectropia nervosa*, not rare, June, by beating along streams; *Prionocyphon discoideus*, not common, by beating; *limbatus*, three examples; *Helodes pulchella*, not common, *thoracica*, not rare, on spruce, June; *Scirtes orbiculatus* var. *centralis*, rare, by sweeping; *Cyphon ruficollis* and *obscurus*, are common; *collaris*, rare; *variabilis*, and an undescribed species, not rare; all the above by beating bushes and weeds near marshy places.

RHIPICERIDÆ.

Zenoa picea and Sandalus petrophya, both rare.

ELATERIDÆ.

Tharops ruficornis, common June, about beech logs.
Deltometopus amœnicornis, common, by beating; *rufipes*, one example.
Dromæolus barringtoni and striatus, rare; *cylindricollis*, less rare.
Fornax.—All the species are rare except *orchesides*, which is not common.
Microrrhagus pectinatus, rare; *triangularis*, rare here and St. Vincent.
Eucnemide sp. or n. s.—Three examples, .16 inch. Jeannette.
Entomophthalmus rufiolus, rare, by beating.
Nematodes atropos and penetrans, not common.
Phlegon heterocerus, rare.

Cerophytum pulsator, one example.

Perothops mucida, not common.

Adelocera impressicollis and discoidea, common about old logs, etc.; *marmorata* and *obtecta*, not rare under bark on trees; *arita*, six examples, under bark on oak.

Cardiophorus cardisce, not rare; *convexus*, common fields and hedges; *gagates* and *convexulus*, not rare, by beating.

Horistonotus curiatus, not rare, by beating.

Cryptohypnus abbreviatus, not rare, by beating.

Hypnoidus striatulus, two examples under a stone; *obliquatulus*, common, April, under stones.

Oedostethus femoralis, common on willow, June.

Monocrepidus lividus, common on walnut and hickory; *vespertinus*, not rare; *auritus*, not common, under stones; *bellus*, rare.

Dicrepidus palmatus, not common here, St. Vincent.

Elater.—The species are common except *mixtus*, rare here and St. Vincent; *discoideus* and *vitiosus*, of each three examples, also at St. Vincent; *sayi*, rare; *socer*, not common, May; *militaris*, not common, with *linteus; luctuosus*, not common; *nigricans*, not rare; *rubricus, collaris* and *xanthomus*, not common; *apicatus* var. *phœnicopterus*, occurred at St. Vincent; *pusio*, not rare, on *Ampelopsis* in May. Most of the species are obtained by beating and on blossoms.

Drasterius elegans, not rare, under rubbish.

Megapenthes limbalis, not common, by beating.

Ludius attenuatus, not rare, under bark; *abruptus*, five examples.

Agriotes mancus, rare; the other species are common.

Betarmon bigeminatus, common on spruce, etc., June.

Melanotus.—The species are common, except *corticinus, decumanus, angustatus, trapezoideus* and *castanipes*, none of which are abundant; *pertinax* and *gradatus* are not common.

Limonius auripilis, not rare; *aurifer*, rare; *griseus* is common on weeds on low ground; *interstitialis*, rare; *plebejus* and *quercinus* very common; *confusus* and *basillaris*, not common; *agonus*, common on *Ambrosia trifida* May to June; *ornatipennis*, one example; *definitus, nimbatus*, both rare here at St. Vincent, extending to North Carolina.

Campylus denticornis, on weeds in wet ground, not rare: *productus* occurred at St. Vincent.

Athous brightwelli, common on walnut and hickory; *acanthus*, common on bushes, etc., on low ground; var. *maculicollis*, rare; *cucullatus*, less abundant; *scapularis*, six examples; *equestris*, three examples.

Leptoschema discalceatum, occurred at St. Vincent.

Osteodes tenuicollis, not common, by beating.

Sericosomus viridianus, not rare, on spruce, June: *silaceus* abundant on blossoms, May to July.

Corymbites cylindriformis, common under stones and in grass; *rufipes* and *tarsalis*, not common; *pyrrhos*, not rare, on walnut and hickory; *elongaticollis*, not rare; *sulcicollis*, common in dry rotten stumps; *æthiops*, not common, by beating *Ampelopsis; hamatus*, not common, on oak and maple, June; *hieroglyphicus* and *inflatus*, common; *rotundicollis*, five examples by beating *Ampelopsis*.

Asaphes indistinctus, decoloratus and var. æreus, are all rare here; the other two species are common under stones, etc.

Cebrio bicolor, two examples here, also St. Vincent.

THROSCIDÆ.

Drapetes geminatus, six examples.

Throscus constrictor, common, by beating; *cherrolati*, common, on *Ampelopsis*

BUPRESTIDÆ.

Chalcophora virginiensis, not common; *fortis*, three examples; *campestris*, not rare, breeds in beech, maple, etc.

Dicerca divaricata, common, breeds in beech, maple, etc.; *pugionata*, common, breeds in *Spiræa opulifolia*; *lurida*, common, breeds in hickory; *lepida*, two examples; *spreta* and *tuberculata*, not common.

Pœcilonota cyanipennis, rare.

Buprestis rufipes, not common, breeds in beech; *fasciata* and *striata* common, brought here in pine timber; *ultramarina*, three examples.

Melanophila acuminata, not rare; *fulvoguttata*, three examples.

Anthaxia viridifrons, viridicornis and quercata, common: *cyanella*, not rare; *flavimana*, St. Vincent.

Chrysobothris femorata, common, breeds in hickory, oak, chestnut, etc.; *floricola*, common in pine timber; *trinervia*, not common; *sexsignata*, common, breeds in hickory.

Acmæodera pulchella, common on flowers of *Rudbeckia hirta*, etc.; *culta*, not common, by beating.

Ptosima gibbicollis, common, breeds in *Cercis canadensis*.

Eupristocerus cogitans, not common.

Agrilus ruficollis, common, breeds in *rubus*, *ribes*, etc.; *otiosus*, common, breeds in hickory, oak, etc.; *arcuatus*, common; var. *coryli*, common on hazel; *vittatocollis*, rare, on *Kalmia* and chestnut; *bilineatus*, common, breeds in oak; *granulatus* and *acutipennis*, not rare; *politus*, common, on *Salix obtusifolia*, June; *fallax*, not rare; *obsoletoguttatus*, *subcinctus* and *lecontei* are not common, by beating; *egenus*, breeds in *Robinia*, common.

Taphrocerus gracilis, common, by sweeping in swampy places.

Brachys ovata, common on oak: *æruginosa*, common on hickory, elm, etc.; *tessellata* and *æruginosa* are not common.

Pachyscelis lævigatus, common.

LAMPYRIDÆ.

Rhyncheros sanguinipennis, St. Vincent.

Calopteron terminale, common; *reticulatum*, more common.

Celetes basalis, *cænia*, *dimidiata* and *Lopheros fraternus*, rare.

Eros thoracicus, rare; *aurora*, not rare, under bark, etc.; *sculptilis* and *trilineatus*, rare.

Plateros modestus and canaliculatus, not rare.

Calochromus perfacetus, rare.

Lucidota atra and punctata, common.

Ellychnia corusca and var. common about trees, etc.

Pyropyga nigricans and decipiens, common; *fenestralis*, not common here, but more so towards the mountains.

Pyractomena lucifera, not rare; *borealis*, more rare.
Photinus marginellus and castus, common; *scintillans*, not rare; *pyralis*, rare.
Photurus pennsylvanicus, common on low ground.
Phengodes plumosa, rare, Jeannette.
Chauliognathus pennsylvanicus, everywhere; *marginatus*, abundant in localities, especially toward the mountains.
Podabrus.—The species are common, except *diadema*, rare; *cinctipennis*, *limbellus* and *punctatus*, not rare; *pattoni* common near water.
Silis percomis, not rare, April to May.
Telephorus.—All the species are common and abundant.
Polemius laticornis, common.
Ditemnus bidentatus, not common.
Trypherus latipennis, not rare, weeds on low ground.
Malthinus atripennis, not rare.
Malthodes.—The species are common.
The Lampyridæ have not been carefully collected.

MALACHIDÆ.

Callops 4-maculatus, not common.
Anthocomus erichsoni, common; *fulvilabris*, rare.
Pseudebæus apicalis and bicolor, not common; *oblitus*, common.
Attalus terminalis, common; *otiosus*, rare; *scincetus*, not rare.

CLERIDÆ.

Elasmocerus terminatus, bred abundantly from grape vines, where it is parasitic on the larvæ of *Plymatodes amœnus*.
Cymatodera bicolor and undulata, common by beating *Vitis* and *Ampelopsis*; *inornata*, obtained from hickory limbs, having been parasite on larvæ therein.
Procera castanea, eight examples once under bark.
Trichodes apivorus, rare here and at Jeannette.
Clerus 4-signatus, two examples; *4-guttatus* var. *nigripes* not common; *lunatus*, Jeannette, rare: *thoracicus*, not rare.
Thanasimus dubius and trifasciatus, rare at St. Vincent.
Thaneroclerus sanguineus, about old trees, April to August.
Hydnocera.—The species are common by beating, except *longicollis*.
Phyllobænus dislocatus and Ichnea laticornis, not rare.
Chariessa pilosa and var. common, breeds in hickory.
Cregya vetusta, rare; *oculata*, not rare.
Orthopleura damicornis, not rare.

PTINIDÆ.

Ptinus brunneus and quadrimaculatus, of each two examples by beating; *fur*, several examples in a stable.
Eucrada humeralis, three examples, June.
Oligomerus sericans, rare; *alternans*, one example.
Hadrobregmus errans, common; *carinatus*, one example; *pumilus*, two examples bred from hickory limbs.
Trichodesma gibbosa, not rare, on elm sprouts.
Trypopitys sericeus, not rare.
Petalium bistriatum, not common, by beating.

Theca profundæ, three examples.
Eupactus nitidus, not rare, by beating.
Xyletinus peltatus, six examples bred from hickory; *lugubris*, two from osage orange.
Hemiptychus gravis, *nigritulus*, *castaneus*, not rare.
Protheca puberula, rare; *hispida*, rare.
Dorcatoma setulosum, not common; *pallicorne*, rare here, common, St. Vincent; examples of two undescribed species.
Cœnocara oculata, common, by beating and in old wood.
Ptilinus ruficornis, common in dead maple, beech, etc.
Endecatomus rugosus, rare, November, in oak bark.
Sinoxylon basilare, common, bred from hickory, grape, etc.; *bidentatum*, rare.
Bostrichus bicornis, common, bred from hickory; *truncaticollis*, rare.
Dinoderus punctatus, not rare; *densus*, rare, bores into trees like *Ptilinus*.
Lyctus striatus, *opaculus*, *planicollis*, not common.
Trogoxylon parallelopipedum, not rare.

CUPESTIDÆ.

Cupes concolor, not common; *capitata*, St. Vincent.

LYMEXYLIDÆ.

Lymexylon sericeum, rare, under chestnut bark.

CIODIDÆ.

Cis creberrimus, not common, under bark; *fuscipes*, common.
Ennearthron thoracicornis and *Ceracis sallei*, common.
Eurysphindus hirtus, not common, June, in fungus.
Sphindus americanus, not rare in fungus.

LUCANIDÆ.

Platycerus quercus, not rare under bark; *depressus*, rare.
Nicagus obscurus, *Lec.*—Sixty examples once on a sandy shore, April.

SCARABÆIDÆ.

Canthon viridis, three examples.
Chœridium histeroides, common on old roads.
Copris carolina, not common.
Phanæus carnifex, abundant in localities.
Onthophagus, var. *orpheus*, not common.
Aphodius fossor, not yet common, in the mountains also; *putridus* is rare; *bicolor*, common in some localities; *terminalis* is rare; *rufipes* occurred at Jeannette, St. Vincent and in Somerset County; *rubripennis* and *oblongus* are rare (the former also at St. Vincent); the other species are common.
Dialytes truncatus, rare here and St. Vincent; *striatulus*, common under stercor, stones, etc.; *ulkei*, St. Vincent; occurred also in northwestern Ontario.
Atænius abditus and gracilis, common, wet, muddy places; *cognatus* common, ejectamenta, etc.
Psammodius.—An example of an undescribed species, St. Vincent.
Bolboceras var. tumefactus, six examples; *lazarus*, five examples.
Odontæus cornigerus, one example.

Geotrupes egeriei and **balyi**, rare; *hornii*, common in stems of mushrooms, September.

Clœotus aphodioides, common in holes in and under bark of oaks, April; *globosus*, two examples.

Trox tuberculatus, *erinaceus*, *insularis*, *terrestris*, *scaber*, all are rather rare; *striatus*, one example; the other species are abundant.

Hoplia trifasciata, not rare on cratægus and apple, April, May; *trivialis*, rare, April, on plum; *mucorea* and *modesta*, not rare, April to June on apple, pear, cratægus, etc., on low ground.

Dichelonycha elongata, common; *subrittata* common, especially on hazel; *fusculu* common on biennial oak; *albicollis*, common on spruce.

Serica vespertina, common April; *iricolor* and *sericea* not rare, April, May; *trociformis*, not common; the species occur on hills among huckleberry more commonly.

Diplotaxis liberta, rare, Jeannette; *frondicola* not common.

Lachnosterna gibbosa, most common sp.: *inversa*, not uncommon; *micans*, rare; *vehemens*, one example; *arcuata*, not rare; *cephalica* (*insperata*), common; *dubia*, not rare; *fusca*, common; *barda*, one example, Chestnut Ridge, near St. Vincent; *marginalis*, not abundant; *fraterna*, common; *rugosa*, not rare; *innominata*, one example; *balia*, common; *villifrons*, not rare; *nitida*, one example, now in Dr. Horn's cabinet; *hirticula*, common; *illicis* Knoch, not rare; *crenulata*, not common; *tristis*, common.

Anomala marginata, rare, Jeannette; the other species common.

Strigoderma arborcola, not common, June.

Cotalpa lanigera, not common, May.

Polymœchus brevipes, not common, mostly at light.

Chalepus trachypygus and *Liggrus relictus*, not rare, along sandy shores.

Aphonus tridentatus, not common about flowers.

Xylorictes satyrus, common, July, roots of ash trees.

Dynastes tityus.—Jeannette, several examples.

Allorhina nitida, rare, eating blackberries.

Euphoria sepulchralis, three examples.

Cremastochilus variolosus and **harrisii**, of each two examples; *canaliculatus*, common, April, June, on wing, and all with ants.

Osmoderma eremicola, not rare; *scabra*, common, breeds in beech, apple, cherry, etc.

Gnorimus maculosus, not rare, on bloom, June.

Trichius bibens, on blackberry, June, not rare.

Valgus canaliculatus, common on blossoms; *squamiger*, not common; both hibernate in colonies in old trees.

SPONDYLIDÆ.

Parandra brunnea, common in rotten heart of trees.

CERAMBYCIDÆ.

Orthosoma brunneum and *Prionus laticornis*, both common, flying at night; *imbricornis*, less common.

Tragosoma depsarium, taken at Jeannette, rare.

Sphenostethus taslei, rare.

Asemum mœstum and *Criocephalus agrestis*, not common.

Tetropium cinnamopterum, rare here, St. Vincent.
Smodicum cucujiforme, not common, under bark.
Physocnemum brevilineum and *Rhopalopus sanguinicollis*, rare here; not rare near the mountains; St. Vincent.
Phymatodes variabilis, not common; *amœnus*, bred abundantly from grape; *dimidiatus*, occasional, the larva probably imported in lumber; *varius*, not common, breeds in white oak.
Merium proteus, rare.
Callidium antennatum.—Jeannette, rare; *æreum*. three examples.
Dryobius sexfasciatus, rare, under bark on trees.
Gracilia minuta, three examples, in a store-house.
Stromatium pubescens, one example, also at St. Vincent.
Chion cinctus and var. common, bred from hickory.
Eburia quadrigeminata, not common.
Romaleum atomarium and rufulum, not common, at light.
Elaphidion mucronatum, not rare; *incertum*, common; *villosum*, abundant, bred from hickory and oak; *unicolor*, common; *cinerascens*, two examples;
Tylonotus bimaculatus, not common.
Heterachthes 4-maculatus, not rare, bred from hickory.
Obrium, not common, April to June, here and St. Vincent.
Molorchus bimaculatus, very abundant.
Callimoxys sanguinicollis, five examples, June.
Rhopalophora longipes, not rare, on *Ceanothus*, June.
Purpuricenus humeralis, one example, not rare in the mountains; *axillaris*, not rare, by beating hickory, from which it is bred.
Batyle suturalis, not common, on *Helenium*, August.
Stenosphenus notatus, common, by breeding from hickory.
Cyllene pictus, common, bred from hickory, April; *robiniæ*, common on *Solidago* September, breeds in *Robinia*.
Plagionotus speciosus, rarely taken.
Calloides nobilis, one example, and at St. Vincent.
Arhopalus fulminans, not rare, April to May.
Xylotrechus colonus, common, May to August; *sagittarius* and *4-maculatus*, of each two examples, also at St. Vincent; *undulatus*, rare; *nitidus*, St. Vincent.
Neoclytus scutellaris, six examples; *luscus*, not rare, by breeding from hickory, grape, elm.
Clytanthus ruricola, common on blossoms May to June; *albofasciatus*, not common, bred from hickory, two varieties.
Microclytus gazellula, rare here, common at St. Vincent.
Cyrtophorus verrucosus, common on grape.
Euderces picipes, abundant, April to August.
Distenia undata, rare.
Desmocerus palliatus, common, breeds in *Sambucus*.
Necydalis mellitus, not rare.
Encyclops cæruleus, common, April to May on bloom.
Rhagium inquisitor, common under pine bark, April.
Centrodera decolorata, rare, St. Vincent; *picta*, rare here, not rare at St. Vincent: *sublineata*, two examples.
Toxotus schaumii, not common, June, bred from *Amelanchior*; *3-vittatus*, not common on *Viburnum*, June; *cylindricollis*, not common; *cinnamopterus*, common on *Rhus*, June.

Pachyta monticola, not common, local; also St. Vincent.

Anthophilax malachiticus, not common in mountains near St. Vincent, beat from chestnut bushes, June; *attenuatus*, rare in Elk County.

Acmæops bivittata, abundant; *directa*, common on *Ceanothus*.

Gaurotes cyanipennis, common, breeds in *Juglans alba*; *abdominalis*, abundant in one locality (north from Rosses' grove).

Bellamira scalaris, rare, Jeannette, St. Vincent.

Strangalia bicolor, not common; the other species common.

Typocerus zebratus, rare; *velutinus*, common July to August; *lugubris*, not common on *Heracleum*, etc., June.

Leptura emarginata, one example, taken by Mr. Klages; *subhamata*, six examples; var. *elegans*, St. Vincent; *lineola*, common on wild bloom; *rubida*, one example: *chalybæa*, not rare, June; *capitata*, not common, wild places; *nana* and var. *hæmatites* common May to June on wild bloom. *Cratægus*, etc. (for this synonymy see Tr. Am. Ent. Soc. xv, 301); *exigua*, not common; *nitens*, common, breeds in white oak stumps; *cordifera*, not common; *nigrella*, St. Vincent; *canadensis*, rare and at Jeannette, breeds in pine; *vagans*, not common; *rubrica*, not rare, on *Cornus florida* April; *circumdata* and *proxima*, not common; *biforis*, not common, St. Vincent; *8-notata* and *vittata*, common May to June; *pubera*, not common; *ruficollis* and *sphæricollis*, not common here, more so toward the mountains; *vibex*, not rare in wild places; *aurata*, not common, wild places; *mutabilis* and var., not rare in wild places and near the mountains.

Cyrtinus pygmæus, not rare, on bloom May.

Psenocerus supernotatus, common on grape, *Ribes*, etc.

Monohammus titillator, rare; larvæ probably imported in southern pine; *scutellatus*, occasional; *confusor*, more frequent, brought in pine logs.

Dorcaschema wildii, common on Osage orange; *alternatum*, common on Osage orange and mulberry; *nigrum*, common by breeding from hickory.

Hetœmis cinerea, common, bred from Osage orange, mulberry and hickory.

Goes tigrina, one example; *pulchra*, not rare on hickory, July; *debilis*, rare; *tessellata*, two examples seen; *pulverulenta*, not rare, beech, wild cherry, July; *oculata* not rare, common at St. Vincent.

Plectrodera scalator, taken here by a collector.

Acanthoderes decipiens, not common; *quadrigibbus*, rare here and St. Vincent.

Leptostylus aculiferus, common, breeds in apple, beech, etc.; *parvus*, not common on oak; *perplexus*, not common; *macula*, common breeds in hickory.

Liopus variegatus and **alpha**, common; *punctatus*, rare.

Dectes spinosus, common, breeds in *Ambrosia*.

Lepturges angulatus and **signatus**, common; *querci* and *facetus*, common, breed in hickory.

Hyperplatys aspersus and **maculatus**, both common, by beating herbage.

Urographis fasciatus, common in oak bark.

Ecyrus dasycerus, not rare, breeds in hickory.

Eupogonius tomentosus, five examples bred from hickory; *restitus*, not common, bred from hickory; *subarmatus*, not common, bred from elm.

Oncideres cingulata, not rare, September.

Saperda calcarata, not rare, breeds in diseased *Populus*; *candida*, not rare; *cretata* and *fayi*, common in limbs of *Cratægus*; *vestitus*, not rare, on linden; *discoidea*, common on hickory and walnut, in which it breeds; *tridentata*,

common on elm; *lateralis*, not rare on elm and hickory; *punctieollis*, not common on *Rhus radicans*, June; *concolor*, common, breeds in *Salix longifolia*.

Obera bimaculata, three examples; var. *tripunctata* and *basalis*, not common; *tripunctata*, not rare by beating, May and June; *ruficollis*, rare, also at St. Vincent.

Tetraopes canteriator.—Jeannette; *tetraophthalmus*, common.

CHRYSOMELIDÆ.

Donacia palmata and piscatrix, common on *Nuphar*; *subtilis* and *æqualis*, abundant on rushes and sedges on marshy ground; *emarginata*, a few examples with the above; *jucunda*, not common, on marsh grass on a hillside, not near *Nuphar*, sedge nor rush.

Orsodacna atra, common on bloom, etc., April to June.

Zeugophora varians, common on *Populus*, June.

Syneta ferruginea, common by beating, May to July.

Lema trilineata, everywhere.

Anomœa, abundant on *Robinia*, etc., May.

Coscinoptera dominicana, rare.

Babia 4-guttata, common, by beating.

Chlamys plicata, common, on huckleberry.

Exema dispar, common by beating.

Bassareus congestus rare: *formosus*, not common on *Sambucus*, June, var. *sulfuripennis* occasional on *Sambucus*; *mammifer* and var. *sellatus* common on walnut and hickory; var. *pretiosus*, common on hickory and hazel; var. *luteipennis*, all females, common on hazel, June; *lituratus*, common by beating.

Cryptocephalus notatus and var. common on *Rubus*; *quadruplex*, common on elm, etc.; *guttulatus*, common on white oak, etc.; *venustus* and var. common by sweeping; var. *simplex*, rare; *gibbicollis*, not common; *mutabilis* not rare, on hazel, *viburnum*, oak sprouts, etc.; *tinctus*, three examples.

Pachybrachys othonus, *pubescens* Oliv. and *picturatus*, not rare, by beating and sweeping; *trinotatus*, not common; *tridens*, common on *Rhus radicans*; *carbonarius*, rare; *luridus* and *atomarius*, common, by beating, etc.; *femoratus*, *infanstus* and *hepaticus*, not rare; *dilatatus*, not rare, by beating.

Monachus ater, *saponatus*, *Diachus auratus* and *pallidicornis*, all common by beating; *Triachus atomus*, not rare on huckleberry, June.

Fidia longipes, abundant on grape.

Xanthonia 10-notata, common on oak; *villosula*, common on oak; a black variety occurs on hazel.

Glyptoscelis pubescens, common on spruce; *barbata*, on hickory.

Graphops pubescens, common on *Oenoth. bien.* July; *curtipennis* and *marcassitua*, not rare, by sweeping and under leaves in the Fall.

Typophorus viridicyæneus, not common, July; *cœrulus* and varieties, common; var. *aterrimus*, on *Solidago*; *thoracicus*, by beating; *quadrinotatus quadriguttatus* and *sexnotatus*, on hickory, walnut, etc; *sellatus*, abundant on *Hypericum prolificum*, June.

Tymnes tricolor, common on chestnut, hickory, etc., June, July; *violaceus*, abundant when found, on hickory sprouts, July; *metasternalis*, taken once abundantly on *Cratægus*, June; greatly resembles *Rhabdopterus picipes*, which is common on grape, etc.

Nodonota tristis, common on *Lespedeza*, *Ceanothus*, etc.; *convexa*, on *Ambrosia trifida*. July to August; *puncticollis*, on wild roses, June.

Chrysodina globosa, abundant, by sweeping, June to August.

Doryphora clivicollis, common on *Asclep. incarnat.*

Chrysomela suturalis, common on *Ambrosia*; *similis*, less common on *Ambrosia*; *præcelsis*, not rare, on *Convolvulaceæ* on low ground; *elegans*, not rare, by sweeping on river-shore; *scalaris*, not rare, on various trees; *philadelphiaca*, three examples; *spirææ*, common on *Spiræa opulifolia*; *bigsbyana*, on maple, willow, *Alnus*, etc., river-shore.

Plagiodera viridis, rare.

Gastroidea polygoni, common on *Polygonum*; *cyanea*, abundant on *Rumex*, July.

Melasoma lapponica, common, river-shore, on willow; *scripta*, less common.

Phyllodecta vulgatissima, common on *Salix longifolia*.

Trirhabda canadensis, common; larvæ on *Solidago*.

Galerucella tuberculata, common river-shore on willow; *caricollis*, rare here, more common near mountains, on *Prunus*, beneath partly black; *rufosanguinea*, common on *Azalea* May, beneath all rufous; *notulata*, common, imago and larva on *Ambrosia*, August; *notata*, not common; *nymphææ*, common on *Nuphar*, June.

Phyllobrotica limbata, not common.

Luperodes varicornis, not common; *thoracicus*, not rare, on willows and plants near water; *meraca*, not rare, on wild rose, June; *cyanellus*, abundant on many shrubs, easily confounded with *meraca*.

Phyllechthrus gentilis, common on locust, *Lespedeza*, etc.

Galeruca externa, rare.

Cerotoma trifurcata, common on *Lespedeza*.

Blepharida rhois, not common, on *Rhus*.

Oedionychis gibbitarsis, common; *thoracica* and *vians*, rare; *thyamtoides*, not common; *limbalis*, var. *subvittata*, *sexmaculata*, *quercata* and var. common by beating on low ground.

Homophœta lustrans, rare.

Disonycha pennsylvanica, not common; var. *pallipes*, common; *caroliana*, rare; *glabrata*, *discoidea* and *triangularis*, not common; *xanthomelæna*, common.

Haltica chalybea, common on *vitaceæ*; *ignita* and var. common, on *Azalea*, *Kalmia*, *Rosaceæ*, etc.; color variable.

Orthaltica copalina, abundant on *Rhus*.

Crepidodera rufipes, abundant on apple, locust, etc.; *helxines*, abundant on apple, cherry, willow, etc., and variable in color and sculpture; *atriventris*, common, by beating.

Epitrix cucumeris, abundant, polyphagous.

Mantura floridana, not rare, April to September.

Chætocnema cribrata, rare, and at St. Vincent; *subcylindrica*, not rare, by sweeping marsh grass; *minuta*, rare; *confinis*, abundant on garden weeds.

Systena hudsonias, abundant; *frontalis*, less abundant, on weeds; *tæniata* and var. *blanda*, not rare, on weeds; *marginalis*, sometimes abundant on oak, Aug

Glyptina spuria, abundant on *Monarda punctata*, August.

Phyllotreta sinuata, not rare; *vittata*, abundant on *Cruciferæ*; *picta*, common by beating hickory sprouts, etc., July; *bipustulata*, not common and at St. Vincent.

Luperaltica senilis, not rare, on various *Compositæ*, July; *fuscula*, rare.
Longitarsus testaceus and melanurus, not rare.
Diboïia borealis, abundant on *Plantago*, in the leaves of which it breeds, according to Mr. Lintner.
Psylliodes punctulata, abundant on garden weeds, August.
Microrhopala porcata, not common, under stones, April.
Odontota.—The species are abundant on trees and plants.
Stenispa metallica, not rare, by sweeping marsh grass.
Physonota unipunctata, once on *Monarda fistulosa* abundantly.
Cassida nigripes, occasional on sweet potato; *birittata*, rare, on vines of sweet potato.
Coptocycla bicolor and signifera, abundant on *Convolvulaceæ; purpurata*, not common; *clavata*, not rare on bushes.
Chelymorpha argus, abundant on *Convolvulaceæ*.

BRUCHIDÆ.

Bruchus mimus, common on plum, *lornus*, etc., April to May; *discoideus*, rare; *alboscutellatus*, abundant, breeds in capsules of *Ludwigia alternifolia; calrus*, rare, beat from peppermint; *obtectus*, sometimes abundant in beans.

TENEBRIONIDÆ.

Phellopsis obcordata, not common, in woody fungus.
Alobates pennsylvanicus, abundant under bark; *barbatus*, less common.
Iphthimus opacus, rare.
Merinus lævis, not rare, under bark.
Upis ceramboides, rare, near Jeannette.
Haplandrus femoratus, not abundant under bark; *ater*, three examples.
Scotobates calcaratus, common, in rotting wood.
Xylopinus saperdioides, common; *æneseens*, four examples.
Tenebrio obscurus, not rare, in damp places about stables; *molitor;* the larva is the common meal worm, often bred to feed to mocking birds; the other species are common under bark, etc.
Opatrinus notus, rare, breeds in old wood.
Blapstinus metallicus, common, sandy places; *mœstus*, not common.
Tribolium ferrugineum and madens, not rare.
Dicœdus punctatus, not rare, in rotten wood.
Echocerus maxillosus, abundant in granaries.
Alphitobius diaperinus, not rare, in granaries.
Uloma impressa, common, in old wood, etc.; *imbellis*, less common; *mentalis*, three examples; *punctulata*, common in old trees.
Eutochia picea, not common, grassy places under things.
Anædus brunneus, not rare, under stones, etc.
Paratenetus punctatus, abundant, by beating dead leaves on bushes; *fuscus*, not rare, under bark, leaves, etc.
Diaperis maculata, abundant in fungi.
Arrhenoplita viridipennis, rare; *bicornis*, common.
Platydema.—All the species are common except *flavipes; picilabrum* is found about the trunks of trees, October to November; *subcostatum*, is not very common.
Alphitophagus bifasciatus, common in dust of feed-stores.

Hypophlœus parallelus, common, pine stumps, April; *thoracicus*, not common.
Pentaphyllus pallidus, thirty examples were found at one time under bark of *Ulmus fulv.* in May.
Boletophagus corticola, abundant when found: *depressus*, not common, mostly on the mountains in woody fungus.
Helops americanus, not common; the other species common under bark, etc.
Meracantha contracta, abundant everywhere.
Strongylium tenuicolle, not rare, by beating.

CISTELIDÆ.

Allecula.—The species are common by beating.
Hymenorus.—The species are common, except *rufipes* and *humeralis*, rare.
Cistela brevis, not rare, by beating; *marginata*, St. Vincent, rare; *sericea*, everywhere.
Isomira 4-striata, common on spruce, huckleberry, etc., June; *ruficollis*, not rare, on bushes in wet places, June to July.
Mycetochares.—None of the species are common or abundant.
Chromatia amœna, rare, three varieties.
Capnochroa fuliginosa and **Androchirus fuscipes**, are common, by beating.

LAGRIIDÆ.

Arthromacra ænea and **Statira gagatina**, common, by beating.

MELANDRYIDÆ.

Tetratoma.—Not common in wood fungus.
Penthe.—The species are common in fungi.
Synchroa punctata, common, breeds in old wood.
Eustrophus.—All common in fungi, etc.
Holostrophus.—Not rare, in fungus and under stones.
Hallomenus scapularis, not rare, in fungi.
Orchesia castanea, common, breeds in much rotten wood.
Melandrya striata, common, about old stumps, etc.
Emmesa labiata, three examples.
Zilora hispida, rare at St. Vincent.
Spilotus 4-pustulosus, not common.
Carebara longula, not common at St. Vincent.
Mystaxis simulator, not common.
Enchodes sericea, rare at St. Vincent.
Serropalpus barbatus, rare.
Hypulus lituratus, not rare under bark, oak, willow, etc.; *vaudoueri*, three examples, under bark.
Symphora flavicollis and **rugosa**, common, by beating.
Scraptia sericea, not rare, by beating.
Canifa.—All the species common by beating.
Nothus varians, abundant on *Cratægus*, etc., June.

PYTHIDÆ.

Lecontia discicollis, *Boros unicolor* and *Salpingus virescens*, rare, in mountainous places.
Pytho depressus, not rare at St. Vincent.

Rhinosimus viridiæneus, rare at St. Vincent.

The Pythidæ seem to affect mountainous regions, and are found mostly under bark.

ŒDEMERIDÆ.

Microtonus sericans, not common, in fungus under bark and by beating.

Nacerdes melanura, rare here; found on the streets, etc.

Asclera ruficollis and puncticollis, common on *Cratægus*, May.

CEPHALOIDÆ.

Cephaloon lepturides, not rare, on flowers, June.

MORDELLIDÆ.

Pentaria 3-fasciata, not common, by sweeping.

Anaspis nigra, abundant on *Viburnum*, *Ceanothus*, etc.; the other species are abundant on all kinds of blossoms, May to June.

Tomoxia bidentata, not common about old trees; *linella*, not common here, more so at St. Vincent; *inclusa* and *hilaris*, rare.

Mordella melæna, one example, occurs in the mountains: *scutellaris*, rare; 8-*punctata* and *marginata*, common on flowers; *serval* and the other species not rare when sought for.

Mordellistena lutea, 3-*fasciata*, *lepidula* and *ornata*, not common, mostly by sweeping on low grounds; *scapularis*, and *comata*, common on flowers, asters, etc., June to August; *aspersa*, *tosta*, *ustulata* and *nigricans*, not common; *guttulata*, *pustulata* and *ambusta*, not rare, mostly by sweeping weeds on low ground: *unicolor*, *marginalis*, *pubescens* and *liturata*, not rare; *fuscata*, common on *Ambrosia trifida*: *pityptera*, not common; *attenuata*, rare.

ANTHICIDÆ.

Eurygenius murinus, not rare; *wildii*, common on Osage orange.

Corphyra canaliculata, not rare on weeds on low ground; *terminalis*, abundant on blossoms; the other species are not rare, by beating.

Xylophilus.—The species are not rare by beating, except *piceus*, only two examples.

Macratria confusa and murina, abundant on willow near water.

Notoxus bicolor, abundant by beating on low ground; *bifasciatus*, abundant on river-shore on herbage, willow, etc.; *monodon*, abundant on ground under things; *anchora*, not common.

Tomoderus constrictus, abundant, April, under stones.

Anthicus obscurus, common on *Sambucus*, June; *cinctus*, on the ground in alluvial places; *rejectus*, rare, under rubbish; *floralis*, not rare on blossoms; *basalis*, more rare; *vicinus*, not rare; *confusus* rare, on the ground under things; *cervinus*, not common; *pubescens*, rare.

PYROCHROIDÆ.

Pyrochroa.—Not rare, by beating.

Dendroides bicolor, abundant, breeds under all bark; *concolor*, common near water by beating.

MELOIDÆ.

Melœ.—Both species not rare.

Nemognatha nemorensis, not rare on *Rudbeckia*.

Macrobasis unicolor, abundant on *Leguminosæ*: *Epicauta trichrus*, common on *Convolvulaceæ*; *vittata* and *lemniscata* are sometimes abundant on potato; *cinerea*, abundant on *Clematis*, *Helianthus* and sometimes on potato, etc.; *pennsylvanica*, abundant on *Solidago*, potato, etc., August to September.

Pompophœa ænea, sometimes abundant on bloom of apple, pear, etc., April.

RHIPIPHORIDÆ.

Myodites fasciatus, taken once here; Prof. Schmitt takes it abundantly near St. Vincent, on *Eupatorium perfoliatum*, on or about August 10th.

RHYNCHITIDÆ.

Auletes ater, not common; *Eugnamptus*, both species common on walnut and hickory.

Rhinchites bicolor, common, June, on wild rose.

Pterocolus ovatus, not rare, wild grape sprouts.

ATTELABIDÆ.

Attelabus analis and bipustulatus, abundant on oak sprouts, June to July; *rhois*, common on hazel, oak sprouts, etc., July.

OTIORHYNCHIDÆ.

Anametis grisea, not rare, July, on *Ambros. trifid.*

Phyxelis rigida, common on wet meadows.

Otiorhynchus sulcatus, two examples; *ovatus*, abundant.

Cercopeus chrysorrhœus, rare here, St. Vincent.

Tanycemus confertus, common, breeds in *Helianthus*, etc.

Pandeletejus hilaris, abundant on white oak.

Aphrastus tæniatus, common, by sweeping on river-shore.

Polydrosus dorsalis, abundant by bush beating, May.

Scythropus elegans, mountains eastward from St. Vincent.

CURCULIONIDÆ.

Sitones flavescens, common; *hispidulus* has lately appeared, and is becoming abundant.

Ithycerus noveboracensis, common on hickory, fruit trees, etc.

Apion decoloratum, not common; *herculanum*, occasionally abundant on *Viburnum acerifolium* going out of bloom, June; *nigrum*, abundant on *Robinia*.

Phytonomus punctatus, abundant.

Listronotus.—The species are common on *Sagittariæ*: *frontalis* is least common.

Macrops humilis, not rare about grass roots in wet places; the other species are abundant on *Sagittaria*.

Pissodes strobi and Hylobius pales, common on pine.

Lixus terminalis, not common; *concavus*, common on *Rumex*; *musculus*, common.

Dorytomus mucidus, rare; *brevicollis*, abundant on willow on river-shore, June.

Erycus puncticollis not rare, breeds in swamps.

Pachyphanes amœnus, common, by beating.

Smicronyx corniculatus, abundant on *Ambrosia*, and is the species mentioned as *griseus* (Can. Ent. xviii, 114); *morio*, is also abundant, and is the *tychoides* mentioned l. c.; the other species are not uncommon.

Endalus ovalis, not rare, on alluvial places,

Tanysphyrus lemnæ, abundant on *Lemna*.

Otidocephalus myrmex and **chevrolatii**, abundant; *lævicollis*, common on hickory; *scrobicollis*, not common on black oak, May; *O. perforatus*, one example, near St. Vincent.

Magdalis barbita, *pandura* and *pallida* common, and breed in white elm; *olyra*, abundant, breeds in hickory; I have seen examples of a green species taken here on spruce.

Tachypterus quadrigibbus, abundant on *Cratægus*.

Anthonomus profundus, not common, July; *nebulosus* and *suturalis*, common on *Cratægus*, plum, etc., April to June; *sycophanta*, not rare, on willow in swamps; *flaricornis*, not rare, on *Hyperieum prolif.*, *Cornus* and *Cratægus*, in valleys; *corvulus*, common on *Vaccineum*, especially *stamineum*, May to June; *musculus*, not rare, also on *Vaccineum*; *signatus*, abundant on *Rosaceæ*, etc.; *scutellatus*, rare, on walnut.

Anthonomopsis mixtus, common on *Cratægus*.

Pseudanthonomus cratægi, common on wild cherry, *Cratægus*, etc.; *incipiens*, common on *Kalmia* going out of bloom, etc., June.

Elleschus scanicus, found on willow once abundantly, and mentioned as *bipunctatus* (Can. Ent. xvi, 106); *ephippiatus*, common on willow sprouts from stumps.

Orchestes ephippiatus and **niger**, common on willow on river-beach; *pallicornis*, less common; *armatus*, one example, on hickory, the type, and now in Dr. Dietz's cabinet.

Acalyptus carpini, not rare, on bushes, May.

Prionomerus calceatus, not common.

Piazorhinus scutellaris, common by beating; *pictus*, not rare, on oak, etc., June.

Thysanocnemis.—The species are not common.

Gymnetron tetrum, abundant, breeds in mullen seed.

Miarus hispidulus, breeds in pods of *Lobel. syphilit.*

Læmosaccus plagiatus, not rare, by beating.

Conotrachelus juglandis, common on walnut and hickory; *nenuphar*, abundant; *retentus* and *seniculus*, not common; *elegans*, common on hickory, on the leaves of which the larvæ live; *cratægi*, abundant on *Cratægus*; *posticatus*, common, bred from fruit of *Cratægus*; *geminatus*, not common, by beating *Ambrosia trifol.*; *cribricollis*, rare; *anaglypticus*, common.

Rhyssematus palmacollis, not common; *lineaticollis*, not rare, breeds in pods of *Asclepias*; *æqualis*, not rare, by beating *Ambrosia trifida*, August.

Microhyus setiger, not common at St. Vincent.

Acales sordidus, not common here, more abundant near the mountains, The single type of *sordidus* was from Texas, and differs by description so greatly from the insects found here as to have induced me to describe it under the name *curtus*. It is found under stones in April, and by beating in July.

Tyloderma foveolatum, abundant, breeds in *Oenothera biennis*, July to August; *fragariæ*, rare; *æreum*, not common.

Cryptorhynchus parochus, not common, breeds in walnut; *bisignatus*, rare; *fallax*, bred from hickory, September; *ferratus*, not rare by sweeping: *minutissimus*, rare.

Piazurus.—Common by bush-beating.

Copturus quercus, common; *binotatus*, less common, by beating; *minutus*, rare, near Jeannette.

Acoptus suturalis, not rare.

Craponius inæqualis, rare.

Cœliodes nebulosus, common, by beating *Polygonum*: *flavicaudis*, abundant on *Urtica*: *acephalus*, abundant on *Polygonum* and *Oenothera*.

Acallodes ventricosus, not common.

Ceutorhynchus rapæ, four examples; *sulcipennis*, not rare; *septentrionalis*, not rare, by beating.

Pelenomus sulcicollis, abundant, on *Polygonum*: *squamosus*, not common.

Rhinoncus pyrrhopus, abundant on *Polygonum*; *longulus*, abundant on *Polygonum virginianum*.

Baris umbilicata, not rare, on ox-eye daisy; *interstitialis*, not common; *confinis*, common.

Plesiobaris t-signum, two examples.

Onychobaris rugicollis, three examples.

Ampeloglypter ater, abundant, on *Ampelopsis*.

Madaris undulata, two var. common on *Ampelopsis*.

Pseudobaris nigrina, common.

Trichobaris 3-notata, abundant, breeds in potato.

Stethobaris tubulata, var. not rare on *Cratægus*; the var. *strigapunctus* is scarcely recognizable by any preceding description. Mr. Casey places it in *Idiostethus* Casey, a new genus.

Centrinus picumnus and scutellumalbum, both abundant on blossoms, June to July.

Centrinopus alternatus, common, on *Eupatorium purpur.*

Nicentrus lineicollis, not rare, on *Ceanothus*; *decipiens*, rare, by beating.

Limnobaris calva, not common, on *Cratægus*, June; *rectirostris*, not common, on *Nuphar*, June.

Balaninus.—All the species are common, and for habits see Can. Ent. xxii, *et seq.* —*caryæ* has since been bred abundantly from hickory nuts.

BRENTHIDÆ.

Eupsalis minuta, abundant, under bark, oak, etc.

CALANDRIDÆ.

Rhodobænus tredecimpunctatus, common July to October.

Sphenopherus sculptilis and melanocephalus, not common; *placidus*, abundant in wet meadows; *minimus*, not rare, in swampy places.

Calandra oryzæ and granaria, abundant.

Dryophthorus americanus, common about wood piles.

Himatium errans and conicum, rare.

Cossonus platalea, common under white walnut bark; the other species common under oak bark.

Stenomimus pallidus, eight examples at one time in a wounded part of a living hickory, also near St. Vincent.

Phlœophagus apionides, one example.

SCOLYTIDÆ.

Corthylus punctatissimus, not common, in maple and in huckleberry roots.
Monarthrum fasciatum, common about wood piles; *mali*, breeds in oak, apple, etc.
Gnathotrichus materiarius, not rare, pine.
Pitpophthorus sparsus, rare; *puberulus*, common, in pine twigs.
Hypothenemus eruditus, shells of foreign nuts; *dissimilis*, not common; three examples found were boring into wounded wild cherry.
Xyloterus politus, not rare, bores in elm.
Xyleborus dispar, not often taken; *celsus*, common, boring in hickory; *xylographus*, not abundant; *pubescens*, common under bark of pine limbs; *cælatus*, abundant under pine bark.
Tomicus.—Common where pine grows, but only occasional here.
Micracis suturalis, breeds in hickory, locust, etc.; *rudis*, two examples bred hickory.
Scolytus quadrispinosus, common in hickory; *muticus*, three examples; *rugulosus*, common, bores in peach, plum, etc.; n. s. (Schwarz) bred once from hickory limbs, greatly resembles *rugulosus*.
Chramesis icoriæ, abundant, breeds in hickory limbs.
Phlœotribus frontalis, not frequent.
Hylesinus opaculus, not rare.
Cnesinus strigicollis, not common, on Osage orange.
Dendroctonus terebrans, common in pine.
Hylastes tenuis, under pine bark, not frequent.

ANTHRIBIIDÆ.

Eurymicter fasciatus, not common, by sweeping.
Hormiscus saltator, not rare, by sweeping.
Cratoparis lunatus, abundant, in dry fungus.
Brachytarsus alternatus and **variegatus**, common by sweeping; *tomentosus*, abundant on *Ambrosia artemisifolia*.

ADDENDA.

Omophron tessellatum Say.—Examples occurred near St. Vincent.
Cymbiodyta rotunda Say.—Taken in the Alleghanies by Mr. Ulke.
Eutheia, n. s.—One example near St. Vincent; a true *Eutheia* (Schmitt).
Ischalia costata Lec.—Several examples near St. Vincent (Schmitt).
Pomphopœa ungicularis Lec.—Several examples near St. Vincent (Schmitt).

ADDITIONAL REMARKS.

Platynus caudatus Lec.—One fine example of this rare species is in my collection, taken by Mr. H. Klages near Pittsburg; its appearance is decidedly subterranean, being of the same color as *Anophthalmus tellkampfii;* the type is described as rufopiceous, but in the present example there is only a slight suspicion of piceous on the head. The unique type is marked Western States, and it also occurred to Mr. C. Dury near Cincinnati, Ohio.

Stenolophus alternans Lec.—This rare and graceful species has occurred to me thrice, once in the bed of the Little Beaver River in southeastern Ohio, and twice near Pittsburgh. Like its sub-congener *Aepus marinus* Stroem. of Europe, it is subaquatic, living under stones, etc., in the bed of streams partly submerged, or along their margins, having the habit of *Schizogenius amphibius.* The type was taken in Pennsylvania near Columbia, and the species was also taken by Dr. LeConte, but further record of its occurrence has not been observed.

Dineutes americanus Linn.—This name was substituted for *assimilis* Kirby (Aubé), because of the synonymy of Dr. Horn in his review of the Olivierian species (Tr. Am. Ent. Soc. xiii, 138). Mr. Roberts, in his Monograph, page 285 of the present volume, adopts *assimilis* Aubé. If *assimilis* Aubé and *assimilis* Kirby are identical, the latter has precedence by one year, on the authority of the respective dates of publication.

Eleusis nigrellus Lec.—Two examples of this small species occurred here in a mountainous place, under bark of maple; the types were from Southern California, and further record of occurrence has not been observed. The Pennsylvania examples are identical with those in my collection from Southern California. This is a long stride, but close collecting will doubtlessly in time close the gap. I have *Stagonium punctatum* Lec. from Arizona, and took it here at the same time with *E. nigrellus.* What has become of *Eleusis canadensis* described by Dr. LeConte, Tr. Am. Ent. Soc. iii, 298?

Perthalycra murrayi Horn.—Apparently rare in the Atlantic region, there being one example in Dr. LeConte's collection labeled Georgia (*Horn*), and an example taken here by myself. It seems common on the Pacific coast, ranging from San Francisco northward to Oregon and western Nevada (*Horn*).

Leptura emarginata Fab.—Through the liberality of Prof. Schmitt examples of this regal species are in my collection from North Carolina. An example taken near Pittsburgh was brought me for identification, and others have been reported. This species and *gigas,* from western Texas, seem closely related—probably racial.

Leptura nana Newm. and var. *hæmatites* Newm.—Mr. Henshaw, in his catalogue of 1895, has overlooked the most recent synonymy of this species as established by Dr. Horn, Tr. Am. Ent. Soc. xv, 301; see also Can. Ent. xxi, 32 and 108; "Entomologica Americana" vi, 125.

Nodonota tristis Oliv.—*N. convexa* Say, *N. puncticollis* Say; by perhaps an oversight, *convexa* and *puncticollis* are not catalogued as species by Mr. Henshaw, 1895.

Otidocephalus perforatus Horn.—Through the kindness of Prof. Schmitt an example of this rare species is in my collection taken near St. Vincent; there is an example in Dr. LeConte's collection, two in Dr. Horn's, and it is said to be in Mr. Ulke's. Besides these I know of no others, except that Mr. Wickham mentions it as occurring in Iowa. Its being palid only suffused with piceous, and entirely apterous, point strongly to a subterranean habit, probably living on bulbous or other roots, like *Cylas formicarius* does on sweet potatoes and the roots of other *Convolvulaceæ*.

ERRATA.

Page 320, line 21 from top for helixines *read* helxines.
" 322, for Drominus *read* Dromius.
" 328, for saucium *read* sacium.
" 328, for 15-punctata *read* Anatis 15-punctata.
" 334, for Ellychina *read* Ellychnia.
" 336, for LIMEXILIDÆ *read* LYMEXYLIDÆ.
" 338, for molochrus *read* molorchus.
" 339, for Hætomis *read* Hetœmis.
" 343, for Mordelistina *read* Mordellistena.
" 346, ninth line from bottom, for .18 mm. *read* .18 inch.
" 349, for avara *read* amara.
" 359, tenth line from bottom, for in stones *read* in stores.

In closing this catalogue, which represents the principal entomological life-work of the author, extending over a period of twenty-three years, it becomes a pleasure to acknowledge the uniform courtesy and kindness extended by many entomological friends. Dr. Geo. H. Horn kindly assisted and gave encouragement in the early days of doubts, difficulties and ignorance, and to the present time in naming species—in fact, a large proportion of the species in this list have at one time or another passed through his hands. The Messrs. Henry and Edward Klages, Rev. P. Jerome Schmitt and others have allowed me the benefit of their extensive collecting, and finally thanks are due to the American Entomological Society for its courtesy in permitting the work to appear under its prestaging anspices; to Mr. Paul C. Stockhansen for its elegant typography and presswork; and to Mr. Charles S. Blake, the learned and accomplished entomological compositor, whose kindly supervision eliminated from these pages the many errors and shortcomings in the manuscript.

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